April 12, 1943

STEEL

The Magazine of Metalworking and Metalproducing

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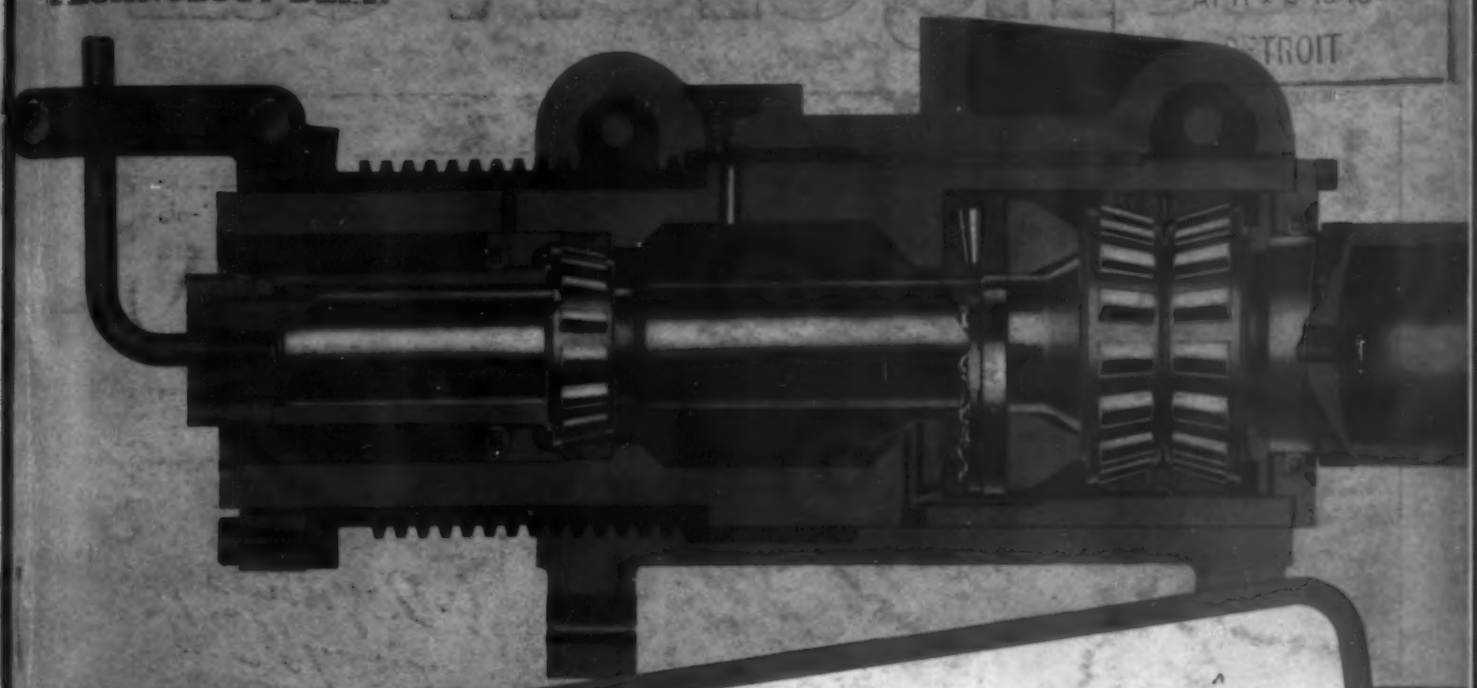
APR 1-2 1943

DETROIT



Sectional view of modern thrust block showing the application of Timken Bearings.

Keep your piercing mills producing for Victory with Timken Bearing Equipped Thrust Blocks.

No seamless tube mill is more dependable than its thrust block. The most important advantage of thrust blocks equipped with Timken Tapered Roller Bearings is their ability to stand up for indefinite periods of sustained operation without maintenance attention. This is due to the elimination of friction and wear; complete control of radial, thrust and combined loads; positive lubrication; greatly increased rigidity of the thrust block assembly.

Timken Bearing Equipped thrust blocks zoom from zero to mandrel speed in the shortest possible time; there is no lag, therefore no delay in mill operation.

Loss of mill time due to the necessity of repairing or replacing thrust blocks is reduced to the vanishing point.

If your tube mills are not now equipped with Timken Bearing thrust blocks it will pay you to replace the obsolete thrust blocks at once. Consult the mill builder or our engineers. The Timken Roller Bearing Company, Canton, Ohio.

TIMKEN

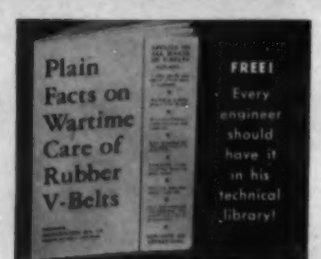
TAPERED ROLLER BEARINGS

"All There Is In Bearings"

X-Ray of IDEAS FOR Longer Wear

Here's the Inside of a Texrope Super-7... America's newest and most Advanced V-belt. Note the new Ways longer Life is Built right into it... for they Point to Ways *you* can Add to the Life and wartime Efficiency of your V-belts... whatever "Make" you may Use!

V-Day needs every V-Belt



It's packed with vital facts on care of *all* makes of V-belts — contains no advertising. Send in for it *today!*

50% STRONGER CORDS produced by the new Flexon process combat stretching. **You** can fight stretching—and the slip and heating that result—by promptly taking up any slack in your drives. Remember, V-belts working round the clock need inspection *4 times as often* as in peacetime!

20% MORE CORDS than before help protect the new Texrope Super-7 against strains and breaks. **You** can minimize breaks in your plant—whatever "make" of V-belts you use—by requiring that V-belts *never* be pried into grooves. Good rule for cutting down internal injuries!

NEW COOLER-RUNNING CUSHION of special rubber "eases" Texrope Super-7 cords around sheaves — for smoother flexing and less heat. **You** can fight heat by preventing misalignment. It causes rubbing of belt sides. So keep sheave grooves in line — shafts parallel.

☛ *When you do Need new V-belts, invest in the Best . . . Texrope Super-7!*

A 1544-A

ALLIS-CHALMERS

WE WORK FOR VICTORY — WE PLAN FOR PEACE

TEXROPE SUPER-7 V-BELTS

*Trade mark registered U. S. Patent Office. Texrope Super-7 V-Belts are the result of the cooperative research and design genius of two great companies — Allis-Chalmers and B. F. Goodrich — and are sold exclusively by Allis-Chalmers. Available in all sizes [illegible] h.p. to 2,000 h.p.

When alloy steel scrap is not classified, critical alloying metals are lost to the war effort

Where alloys are concerned it isn't enough to sweep up turnings, flashings and other scrap and start it back to the steel mills.

When different grades of alloy scrap are flung together, or alloy and common scrap thrown on the same pile, the content of alloying metals, so critical in this alloy-steel war, is sunk without trace. The precious alloys are lost as completely as if they were dumped into the sea.

To help feed hungry furnaces and make more fighting alloy steels, alloy scrap must be classified, right at the spot where it is produced. It is so critical that we cannot afford to waste a pound of it. *One-half of this country's alloy-steel output depends on the availability, and therefore the proper classification, of alloy scrap.*

When alloy scrap gets "lost" it remains lost, for the man-hours that would be needed to pick over and check every shipment simply cannot be spared. And when hidden alloys contaminate steels made to meet certain physical specifications, entire heats may be ruined.

No one knows better than the steel-maker that painstaking classification of alloy scrap is no simple thing, takes patient organization. But it is a job worth doing, and one that can and must be done. There is no other way to make sure that every pound of critical alloying metals in the nation's scrap supply is tagged and made available to do its part in winning the war.

BETHLEHEM STEEL

Our government has issued a classification list showing how alloy steel scrap should be segregated. If you haven't it, and would like to receive a copy, let us send you one. Write to Bethlehem Steel Company, Bethlehem, Pa.

REMEMBER THE

PROBABLY the most disastrous example of obsolescence in history is the Maginot Line. It took 5 years to build, and cost $500,000,000. But—Hitler circumvented it in a few weeks with modern equipment and methods . . . panzer divisions, air forces and fifth columnists.

WE WONDER how many "Maginot Lines" there are in American industry, today. How much machinery, busy now on war production, will become obsolete with the coming of peace? Like Hitler's panzers and air forces, new materials and processes even now in development will drastically reduce the utility value of present machines. Newer and more productive equipment employed by aggressive and ingenious competition will dominate the peacetime markets.

SINCE POSTWAR PLANNING is now both respectable and popular, we believe it will benefit American industry, individually and collectively, to start studying the future usefulness of present equipment. We say *individually,* because of competition within our borders. We say *collectively,* because many of the machines shipped abroad are far ahead of much domestic machinery in newness, usefulness and durability. If we are to match wits and goods with foreign competition after the war, *and maintain our superior standards of living,* we must have more productive machines to overcome lower labor costs in foreign plants.

WORK AND PROSPERITY for all can come only from productive services. Money transferred from one pocket to another . . . such as a government bounty to the unemployed . . . creates nothing. We can look for "business as usual" after the war, only if we replace depreciated and obsolete methods and equipment with the most modern and productive tools which ingenuity can develop.

LET'S NOT HAVE A MAGINOT LINE IN AMERICAN INDUSTRY!

Maginot Line?

THE MONARCH MACHINE TOOL COMPANY • • • SIDNEY • OHIO

MONARCH LATHES

Cover the Turning Field

BEHIND THE SCENES

Cooking with Gas

■ A lot of things are happening these days, and as you have undoubtedly noticed the editors of STEEL have pulled all stops in supplying you with a complete wartime information service on your desk the first of each week.

The young fry would say we're cooking with gas while the oldsters might lean over backwards a bit further and simply take time to advise us that STEEL today is a more essential source of information than it ever has been over the many years they have read it.

Let's take a minute and catch up on some of the more outstanding regular issue performances and extra-curricular services developed in the past few months.

■ Certainly one of the top jobs of any industrial publication in the country has been the continuous flow of information in STEEL since early last year on the development and application of NE Alloy Steels. In addition to digesting and correlating all the available information from the American Iron & Steel Institute, STEEL on its own initiative began early last fall to publish a series of User Reports on these new alternate steels, detailing experience by consumers in the successful application on specific substitutions. This series is still continuing and you will find any changes or new developments in the list of NE Steels reported promptly in these pages.

All of this important information has now been compiled into a 72-page NE STEEL HANDBOOK and NE STEEL SELECTOR which are now available at $1.00 per set. A complete description and order coupon will be found this week on page 133.

■ Or take Priorities and the whole conglomeration of government regulations of which they are a part. Well over a year ago STEEL's Washington editors and priorities staff in Cleveland developed the first special guide on Priorities, Allocations and Prices, published as a separate section. At the same time, as an extra service, STEEL began furnishing at cost the many PD forms required in a hurry and unavailable from regular government sources. Something over a half million of these forms were furnished to industry last year when the need was greatest.

As a supplement to the Priority Guides, a special page in STEEL each week reports all pertinent new orders, changes and revisions in old ones. Wrapped up as a package this complete priority service compares favorably with anything available in the country, and yet it is just a small part of STEEL's whole job each week.

As part of the May 3 issue of STEEL, *a revised and up-to-date issue of the Priorities Guide will be published. Extra copies will be available, as in the past, to regular subscribers free of charge.*

■ Over a ten-week period this year the editors of STEEL published under the feature Windows of Washington one of the most comprehensive and complete reports on postwar planning that has yet appeared in print. The information was compiled by E. C. Kreutzberg, Editor of STEEL, after literally dozens of interviews and contacts with the organizations involved. And in the same way he developed a review of Lend-Lease, a picture of present and postwar opportunities in Latin America, and concluding this week a report on the possibilities involved for materials and equipment manufacturers in food dehydration.

A complete 48-page reprint of Mr. Kreutzberg's report on Postwar Planning will shortly be available to regular subscribers free of charge upon request.

■ Heading southwest now for a complete tour of the aviation and shipbuilding industries is A. H. Allen, Detroit editor of STEEL, and justly famous for his Mirrors of Motordom and Wing Tips columns. Last week you read his on-the-scenes report of the amazing new Douglas plant at Oklahoma City, and the previous week his report on Wright Field and the aircraft scheduling unit. Look for more exclusive and original material in future issues.

Beginning this week, under Mirrors of Motordom, don't fail to read the first of a series on the Postwar Automobile to run over the next four weeks.

■ This week also, E. L. Shaner expands his interpretive analysis of the week's important news in the two-page feature, As the Editor Views the News. Reprints of these two pages are available at cost each week for further distribution among your employes or customers.

■ STEEL is really three magazines in one—a news weekly, an engineering and operating paper—and a weekly market guide. Newswise a nation-wide staff brings you prompt, crisp reports that are channelled down your alley and are an aid in keeping you informed on how to best conduct your business under present conditions of wartime regulations. From a technical standpoint, the engineering articles in STEEL probably give you the greatest roster of authoritative contributors of any publication in the country. From them have come the material which has later been compiled into STEEL's famous set of Ordnance Production Handbooks, the handbook on How to Improve Your Welding, and Improved Forging Technique, all of which are now in use throughout the industry.

■ But already the bottom of the page is crowding us, and we haven't even mentioned such things as the type of convention report published last week by Guy Hubbard on the ASTE at Milwaukee. We weren't able to get there, but certainly after reading Guy's story we had a better "feel" of the meetings and exhibits than if we had been there personally. If you missed it, find your April 5 issue and attend the meetings in print.

■ We promise we won't blast you with this enthusiasm every week but it just snuck up on us all of a sudden what a swell job those two-dozen editors of ours are doing and we're sure you'll fully agree.

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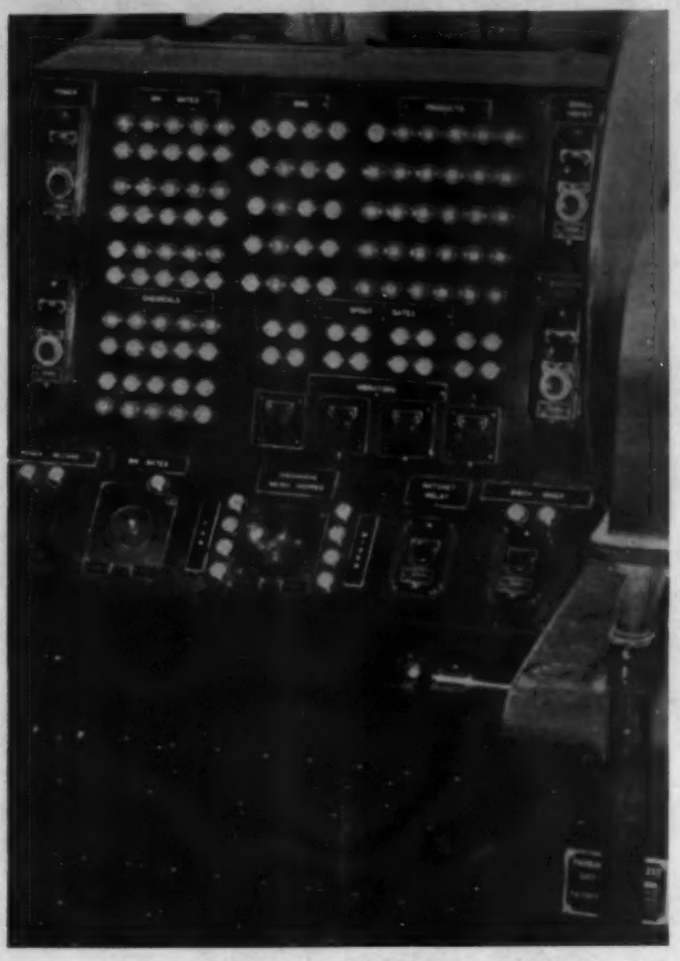


EXACT CONTROL

★

FOR SURE PERFORMANCE

THE bomber pilot's course is guided by precision instruments. Refractory manufacture, too, must be guided by precision control.

Years of experience in meeting practical problems in the open hearth and electric furnace have shown that refractories best suited for modern steel making cannot be made by rule of thumb methods. They must be designed to meet specific conditions met in the furnace, and they must be manufactured to design...for balanced chemical composition, positive physical characteristics, and uniformity of product.

To insure the desired properties in the manufacture of products where extreme accuracy is essential, Basic Refractories developed and installed a plant built around precision equipment, operating automatically throughout. Key to this equipment is the electric control board shown here.

It provides exact and automatic control of those final, critical stages of a process—proportioning and mixing—which began with the manufacture of synthetic mineral compositions designed to perform specific work. Because these controls are mechanical and automatic, there is no possibility of deviation or error.

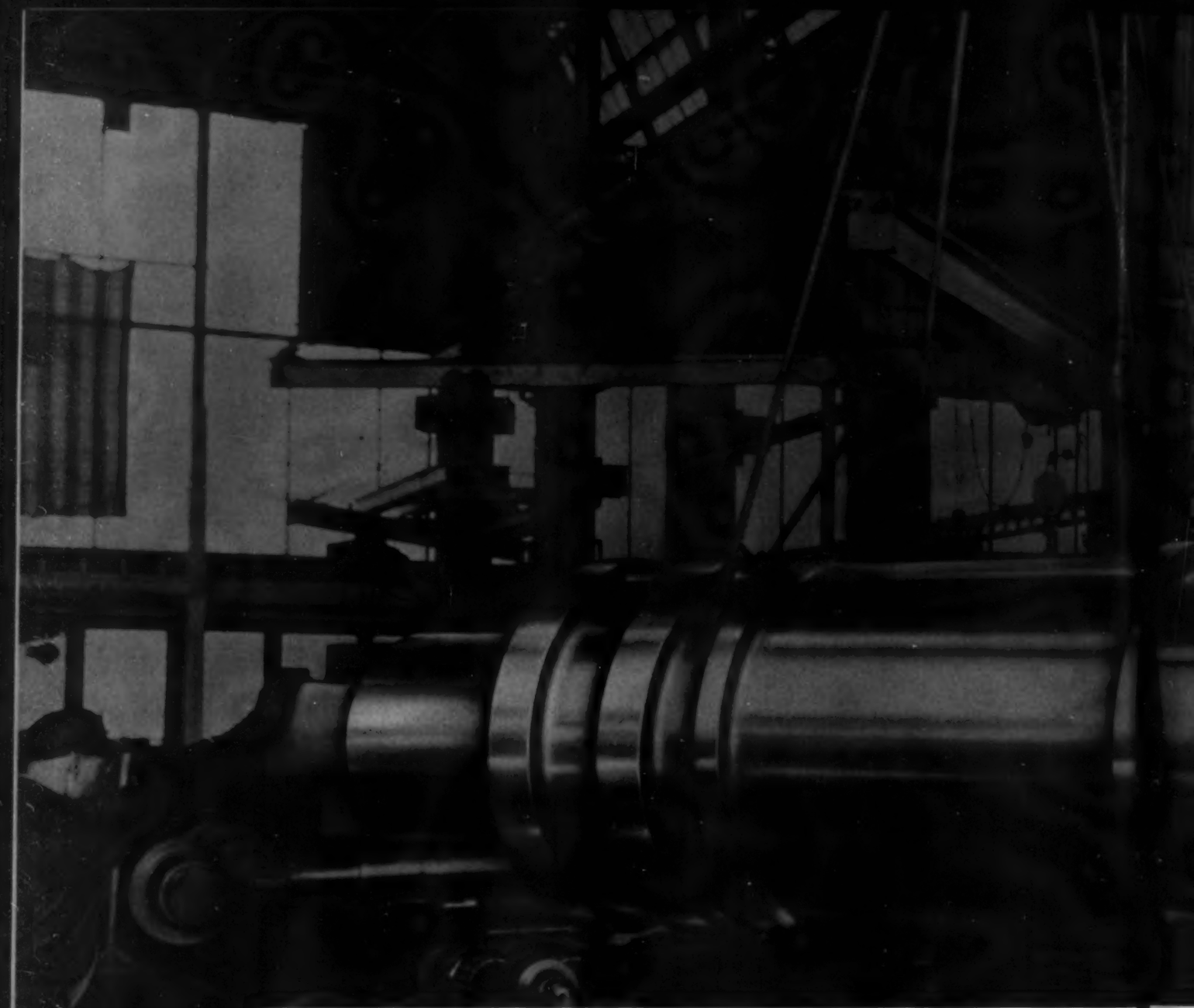
Ramix...Hearth Patch...695 Plastic...Gunmix...are typical products of this plant. Their outstanding performance in severe service is familiar to most furnace men. No small part of their continued success is due to the fact that, combining the best of research and practical experience they are made by a process rigidly controlled to insure uniformity and dependable quality.

BASIC HEARTH REFRACTORIES

BASIC REFRACTORIES, INCORPORATED

CLEVELAND, OHIO

PRODUCERS OF MAGNESITE AND DOLOMITE HEARTH MATERIALS FOR STEEL FURNACES



Meet the Mighty Grand-dad of a thousand Tools of War!

He's big! He's tough! He's a Blooming Roll! He breaks ingots down into slabs or blooms. He, and his companion Ohio Rolls, are withstanding the terrific abuse of record-smashing steel production, and are rolling out the weapons that are rapidly rolling on to Rome, to Berlin, to Tokyo.

CARBON STEEL ROLLS • ALLOY STEEL ROLLS • ALLOY IRON ROLLS
FLINTUFF ROLLS • NICKEL CHILL ROLLS • PLAIN CHILLED ROLLS
MOLYBDENUM CHILL ROLLS • DENSO-IRON ROLLS • HOLL-O-CAST ROLLS

ARMY E NAVY

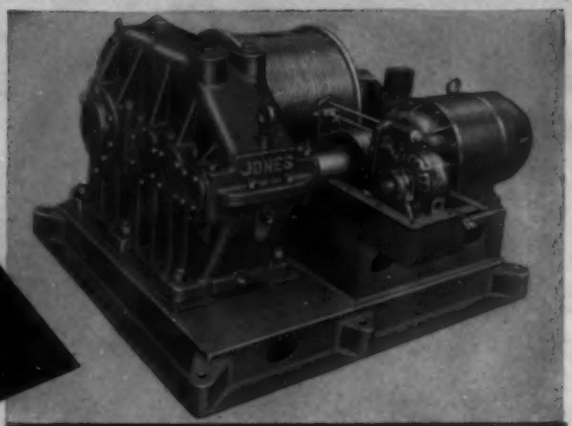
THE OHIO STEEL FOUNDRY CO.

LIMA, OHIO • SPRINGFIELD, OHIO

ENGINEERS • FOUNDERS • MACHINISTS

Ohio Rolls

When the drive is built into the unit



• Jones Skip Hoist Drive built as a complete unit by the Jones organization in several types with base to take any motor specified by the purchaser. This drive is equipped with all the modern protective devices such as cam or nut type limit switches, solenoid or disc type brakes and slack cable switches. The drives are single, double or triple reduction Jones Herringbone Speed Reducers.

FOR many years the Jones organization has been developing various types of drive units in which Jones special or standard speed reducers form an important integral part of the unit.

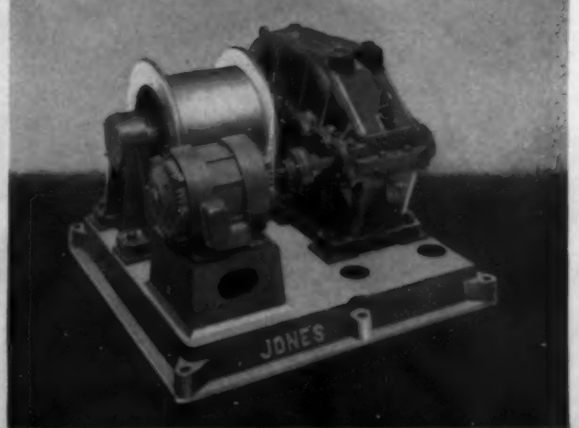
The car puller, door hoist and skip hoist drives illustrated and described here are typical specimens of Jones Unit Drives. These machines are built as complete units by the Jones organization with base to take any motor specified by the purchaser.

The Jones organization has also worked with a great many manufacturers in the application of Jones gears and speed reducers to an extremely wide variety of complete assemblies. You are invited to make full use of this experience in connection with any power transmission problems that you may have.

• Jones door hoists are built in many ratings and may be installed with almost any convenient arrangement of sheaves and cables. Base will take any standard motor. No limit switches of any kind are required with this unit.

W. A. JONES FOUNDRY & MACHINE CO.
4437 W. Roosevelt Road
Chicago, Illinois

Bulletin No. 80, "Jones Drives for Industry", may be helpful in giving you a complete picture of the Jones products, engineering services and manufacturing facilities that are available for helping you solve your drive problems.



• A complete Jones car puller unit. These outfits are for use with wire rope and are manufactured in a wide range of capacities to suit the number of cars to be handled in each plant.

Jones

HERRINGBONE—WORM—SPUR—GEAR SPEED REDUCERS • PULLEYS CUT AND MOLDED TOOTH GEARS • V-BELT SHEAVES • ANTI-FRICTION PILLOW BLOCKS • FRICTION CLUTCHES • TRANSMISSION APPLIANCES

You can cold draw

N-A-X
High Tensile

easily

it's the low alloy steel
with exceptional ductility

Cold forming a product out of N-A-X HIGH TENSILE is no problem, because this low alloy, high tensile steel has the ductility necessary for successful cold forming and drawing. It is truly a remarkable high tensile steel, in that it combines the cold forming properties of mild carbon steel with the valuable qualities of high tensile steel.

Of major importance to users of high tensile steel is the unusually high resistance N-A-X HIGH TENSILE has to *impact* and *fatigue*, at normal as well as at sub-zero temperatures. This means that parts and products made of N-A-X HIGH TENSILE have the stamina to stay on the job, regardless of tough usage.

Great Lakes engineers are available to show you how you can use this really superior high tensile, low alloy steel to advantage. One will be glad to call at your plant, give you the benefit of wide experience in the use of N-A-X HIGH TENSILE in hundreds of exacting applications. No obligation. Write, telephone or wire for one today.

GREAT LAKES STEEL CORPORATION · DETROIT, MICH. *Sales Offices in Principal Cities*

Division of NATIONAL STEEL CORPORATION Executive Offices, Pittsburgh, Pa.

AN OPEN LETTER TO
★ ★ ★ Paul V. McNutt:

LAMSON CORPORATION
PNEUMATIC DISPATCH TUBES · MECHANICAL CONVEYORS OF ALL KINDS
SYRACUSE, NEW YORK

March 1, 1943

The Hon. Paul V. McNutt, Chairman
War Manpower Commission
Washington, D.C.

My dear Mr. McNutt: Manpower Waste in Handling Materials

The President's "Manpower" order of February 9th emphasizes the vital necessity of greater production -- not only more goods per worker due to longer hours but also more goods produced during each one of those hours. Yet one proven source of increased production remains largely unrecognized and untapped.

It is not generally known or realized that Materials Handling Operations consume at least 30% of the total time required to produce manufactured articles. This covers the movement of materials through the manufacturing, storage, and shipping stages. The manpower savings, when manufacturing plants properly apply materials handling equipment, are indeed prodigious, resulting in an amazingly rapid amortization.

We, of the materials handling industry, have countless case histories proving the effectiveness of conveyors and other types of materials handling equipment in increasing production per man hour. Typical of war-production speed-ups are the following - taken at random from our files:

1. Shell-fuze production increased 2½ times.
2. Aircraft accessories production quadrupled with but 25% increase in personnel.
3. Approximately 300,000 man hours of messenger service saved annually in a large bomber plant.

Despite examples like these, which our industry as a whole can multiply a thousand-fold, not one industrial plant in ten employs an engineer whose sole duty it is to find ways and means of reducing this 30% production time loss with its consequent wasted man hours.

Strangely enough, few plants invite a general survey by a qualified materials handling engineer to help eliminate such waste. Furthermore, so far as we have been able to determine, not one technical school in the country includes in its curriculum a course in materials handling as a major subject.

We are bringing this situation to your direct attention so that it may be recognized as one of the very important factors in planning effective manpower use.

Very truly yours,

Carl F. Dietz
President

CFD
emk

LAMSON CORPORATION · SYRACUSE, N. Y.

FIRTHITE SHOWS HOW..

TO BREAK UP YOUR ALLOY-STEEL CHIPS AUTOMATICALLY

FOR SAFETY AND PROFIT

CHIP CONTROL. The rapid machining of **alloy steel** requires effective means of controlling chips. Long, hot, tough chips endanger the operator, make chip disposal difficult, reduce the value of scrap (by $2.00 a ton), cause tool breakage, and delay work.

The remedy is properly designed chip breakers. Tools with chip breakers require a little more power but, where long chips are a problem, chip breakers are the answer.

Aside from the safety factor, chips that can be **shoveled** are readily marketable as scrap, command a higher sale price per ton, and—most important to the war effort—speed the **recovery** of scarce and critical alloys.

NO CONTROL without Chip Breaker OR CHIP CONTROL with Chip Breaker

HOW TO GRIND A CHIP BREAKER
EASILY, QUICKLY, INEXPENSIVELY
Typical
Chip-Groove Design
A quick, simple method of designing and grinding chip breakers, as illustrated, is described on pages 41 to 43 of the FIRTHITE Users' Handbook...or a FIRTHITE Engineer will gladly discuss chip control in your plant.
USERS' HANDBOOK
FIRTHITE
CUTTING TOOLS
FIRTH-STERLING STEEL CO.

Firth - Sterling

STEEL COMPANY

MAKERS OF FIRTHITE TUNGSTEN-TITANIUM CARBIDES FOR STEEL CUTTING

Offices: McKEESPORT, PA. NEW YORK - HARTFORD - PHILADELPHIA . CLEVELAND - DAYTON - DETROIT - CHICAGO - LOS ANGELES

FORTY-THREE STEPS OF CONTROL

in four inches!

Concentric arrangement for back of board mounting.

The new Ward Leonard 4-inch Pressed Steel Rheostat offers the happy combination of a small sturdy power rheostat with a large number of steps and ample current carrying capacity. Like all Ward Leonard Pressed Steel Rheostats this model may be arranged for front of board, rear of board and multiple assembly mounting. Other types and sizes also available. Send for descriptive bulletins.

WARD LEONARD

RELAYS • RESISTORS • RHEOSTATS

Electric control (WL) devices since 1892.

WARD LEONARD ELECTRIC CO., 65 SOUTH ST., MT. VERNON, NEW YORK

GET IN THE SCRAP
One ton of your idle scrap makes two tons of fighting steel. Search your plant again and again—every pound of scrap is important.

Better Steel for War Today... Better Steel for You Tomorrow!

Even before war came, hands trained to the making of steel for peace had turned to the making of steel for war. Because war has made new demands of Continental steel . . . new requirements in specifications, new applications . . . Continental is building a reserve of metallurgical information, production experience and technical improvements. These resources will be at your command when the war is over. Continental will be better equipped than ever to meet your needs in wire and steel sheets and to work with you on your plans for new products and new production. We invite your inquiries now.

CONTINENTAL STEEL CORPORATION
KOKOMO, INDIANA

Plants at Canton, Kokomo and Indianapolis

CONTINENTAL
Manufacturer's Wire

Continental SUPERIOR wire is made in sizes from 34 gauge to ½-inch, in standard and special shapes, and in a wide range of finishes. The different combinations of specifications available are numbered in thousands.

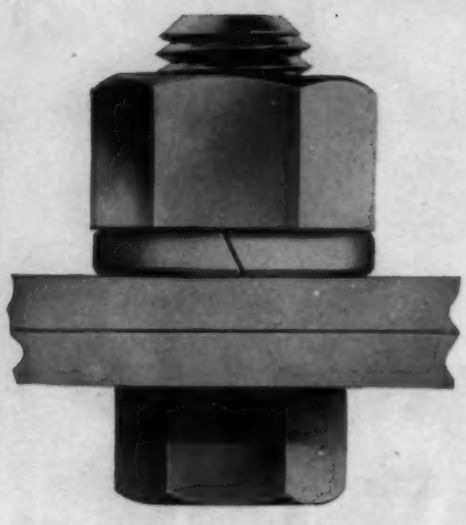
CONTINENTAL STEEL CORPORATION ★ SUPERIOR WIRE

CONTINENTAL
STEEL CORPORATION

PRODUCERS OF—SHEETS: Black, Galvanized, Copperior, Hot and Cold Rolled, Special Coated, Long Terne, etc.
WIRE: Bright Basic, Annealed, KONIK, Coppered, Tinned, Special Manufacturer's, etc.

When we say "spring"...

WE MEAN



Tight—a nut wrenched home sets up great pressure on threads and between all parts.

No other device has the power and the long range of live spring action given you by a Kantlink Spring Washer.

There is no substitute as economical. The short-range multi-toothed washers that bite in can not possibly equal Kantlink's range of spring power.

And the only claim for a fixed nut is that it can't turn on a bolt. Nuts rarely ever turn backward on bolts—they can't turn while there is any pressure at all on the threads of the nut and its bolt. But the **other** parts of almost every vibrating bolted construction wear loose inevitably, **unless** held fast by a strong compensating spring.

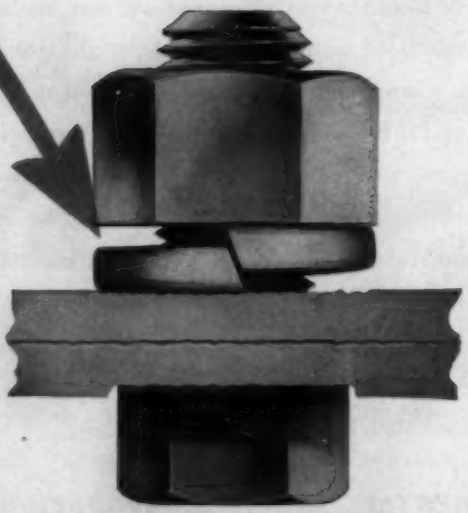
The parts wear loose because of bolt stretch and frictional wear of metal on metal, burrs and flares, and because of pulverizing of paint, scale and rust.

Kantlinks are being used with millions of nuts, bolts and screws of all types. They keep expanding to hold all parts **tight** despite inevitable wear.

In ordering spring washers—specify **Kantlink,** the big long range live spring washer.

Let us send you samples,—send details of your application. Test and compare them on the same job with **any** type of nut, or with any other type of washer. Kantlinks can't lose a real test. Try them for efficiency, economy and real safety.

Write today for descriptive folder.



Still tight. Though the nut never turned, the other parts wore and stretched. The assembly would have loosened except for the wide range of spring power of a—

KANTLINK TRADE MARK

the long-range Spring Washer

THE NATIONAL LOCK WASHER COMPANY
NEWARK, N. J., U. S. A.

AMERICA'S WAR PRODUCTION DEPENDS ON TANKS LIKE THESE

Take a good look at these huge spherical tanks. Chances are your hose, your belts, your packings may come from them or from others just like them.

These are used for storing butadiene in the first of the synthetic plants operated by U. S. Rubber Company . . . a second will soon be in production.

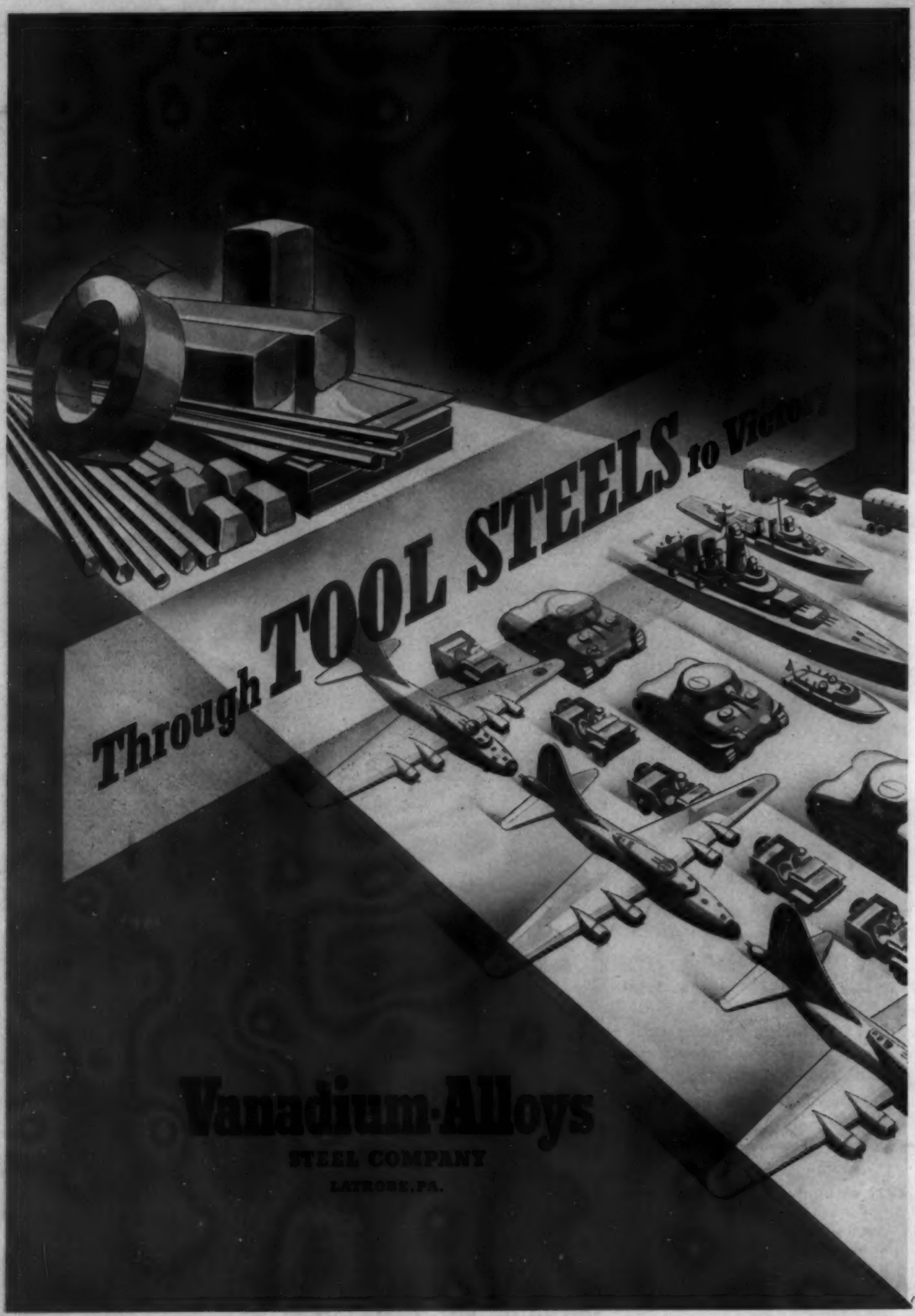
Having worked in the field of synthetic rubber since 1921 we know what uses each of the five basic types of synthetic rubber is best suited for . . . Neoprene, Buna-S, Buna-N, Butyl and Thiokol . . . U. S. Rubber uses all five types . . . knows which one to select for the performance required . . . and how to compound the specific synthetic rubber for the specific task. This experience is important to you.

Our booklet on synthetic rubber will give you much valuable information. Send for your copy.

Mechanical Goods Division

UNITED STATES RUBBER COMPANY

ROCKEFELLER CENTER • NEW YORK


Through TOOL STEELS to Victory
Vanadium-Alloys
STEEL COMPANY
LATROBE, PA.

LANDIS *Chaser Accuracy Is Maintained Throughout Its Life by the*

PERMANENT THROAT

12 Features of the LANDIS TANGENTIAL CHASER

1–Permanent throat permits close to shoulder threading throughout life of chasers
2–Rake angle range covers all machinable materials
3–Free cutting condition permits maximum cutting speeds
4–Simple grinding operation renews entire cutting edge and leading feature
5–Line contact with work lessens friction and minimizes thread distortion
6–Leading feature insures thread of accurate lead
7–Lateral absorption of cutting strain reduces vibration and chaser breakage
8–Right and lefthand threading feature reduces chaser equipment
9–Standard chasers thread all diameters with proper chaser holders
10–Interchangeability of chasers lowers operating cost
11–Chaser length provides exceptionally long life and low tool cost
12–Permanent throat gives equal distribution of cut

PERMANENT THROAT GIVES EQUAL DISTRIBUTION OF CUT

The throat is designed so as to enable the chasers to distribute the cut equally.

The initial accuracy of the chaser is maintained throughout its life. The cutting edge is renewed each time the chaser is reground, however no grinding is done on the throat or "lead" angle—it remains permanent and is not altered in any way.

The Finest Thread Cutting Tool in Industry

LANDIS
MACHINE COMPANY
WAYNESBORO, PA., U.S.A.

THREADING MACHINERY—THREAD CUTTING DIE HEADS—COLLAPSIBLE TAPS

McKAY ELECTRODES SPEED PRODUCTION

IN EVERY WAR INDUSTRY

War and *necessity* are one . . . and necessity is the "mother of invention."

When war demanded new conceptions of production, *revolutionary applications of welding* were "invented" to meet the need.

In no small measure McKAY Shielded-Arc Electrodes contribute to the total accomplishment.

For it is only natural that a manufacturing policy, which merited the title "the researched line," should likewise rise to meet the requirements of this emergency. Thus new analyses, new coatings, new sizes, new ranges of adaptability . . . plus ever growing volume . . . have caused McKAY Electrodes to help speed production in every type of war industry.

THE McKAY COMPANY · PITTSBURGH, PA.

PACIFIC COAST SALES OFFICES: 125 S. Santa Fe Ave., Los Angeles · 100 Howard St., San Francisco

The McKay line includes regular carbon steel, stainless, and alloy steel electrodes for every welding purpose. Literature on request.

Among the first honored with the Navy "E", The McKay Company is proud of the broader award of the Army-Navy "E".

McKAY WELDING ELECTRODES

AND INDUSTRIAL, MARINE AND AUTOMOTIVE CHAINS

"KEEP ON BUYING U. S. WAR BONDS"

The Trend is Toward
SHENANGO-PENN
Centrifugal Casting

MANY manufacturers are finding that *centrifugal casting* by Shenango-Penn offers an improved, economical process for producing vital war products. In the marine and aviation fields, parts formerly made by other methods, are now being produced centrifugally, with impressive savings in production time—the conservation of critical materials—and actual improvement in product performance.

Shenango-Penn has pioneered centrifugal casting—can cast tubular bars or cylinders ranging from 2″ to 26″ O.D. and up to 26 ft. in length, that meet all Army, Navy and Air Corps requirements—deliver long, uninterrupted service.

If you want more facts on the process and how it may help your production problems, write for new Bulletin No. 143 today.

SHENANGO-PENN MOLD COMPANY

412 WEST THIRD STREET, DOVER, OHIO

Executive Offices: Pittsburgh, Pa.

ALL BRONZES •
MONEL METAL •
ALLOY IRONS •

SHENANGO-PENN

ORDNANCE DEPT. "SPEC" AXS-736 REV 1

— YOUR FINISH FOR CARTRIDGE CASES, PRIMERS, and OTHER STEEL PARTS

These are a few of the more important Government "Spec." finishes which we can furnish. For more complete list with descriptions send for "Spec." book.

3-67E	3-162B
14080	14105B
14120	JQD-144A Tentative
E-5e	196-131-59
P-27-b-2	3-163
3-86A	3-165A
52-P18 (Int)	M-485b

HOMB-ES-680a Tentative

AXS-736 Rev 1 Tentative

AN-TT-P-656 Amend 1

AN-TT-E-501

AN-TT-D-514

PXS-783 Rev 3

PXS-979 Rev 1

When steel began to replace brass and other non-ferrous metals for ordnance parts, EGYPTIAN technicians were ready with a special finish expressly developed for steel that would give adequate protection with speed and economy.

Fully meets U. S. Gov't Specification AXS-736 Rev. 1.

You'll like this new member of the EGYPTIAN family. Use it on steel percussion primers, and on both exterior and interior of steel cartridge cases to retard corrosion and reaction between casing and propellant material.

A 30 minute bake at 350° F after dip or spray application does the trick.

Send for 1943 Edition of our U. S. Gov't "Spec" Book S

THE EGYPTIAN LACQUER MANUFACTURING CO.
Rockefeller Center New York, N. Y.

EGYPTIAN FINISHES

EGYPTIAN
Superior FINISHES

ROEBLING "Blue Center" is in there with them!

Trained and equipped to work *and* fight, our U. S. Navy Construction Battalion—"Sea Bees"—are erecting needed bases and facilities in the South Pacific today as fast as the terrain can be reasonably cleared of Japs. As often as not, before turning to jobs like the generator installation above, these versatile recruits from America's construction industry lend a hand with the "terrain clearing" themselves . . .

Wherever these work-wise veterans are working—hacking an airport out of New Guinea jungle, installing a generator to furnish light and power for beach installations in the Solomons, building roads and barracks and bases the world around—they use wire rope they know they can depend on to work and fight right along with them. Rope that has the right qualifications—type, size, construction—for the job on hand.

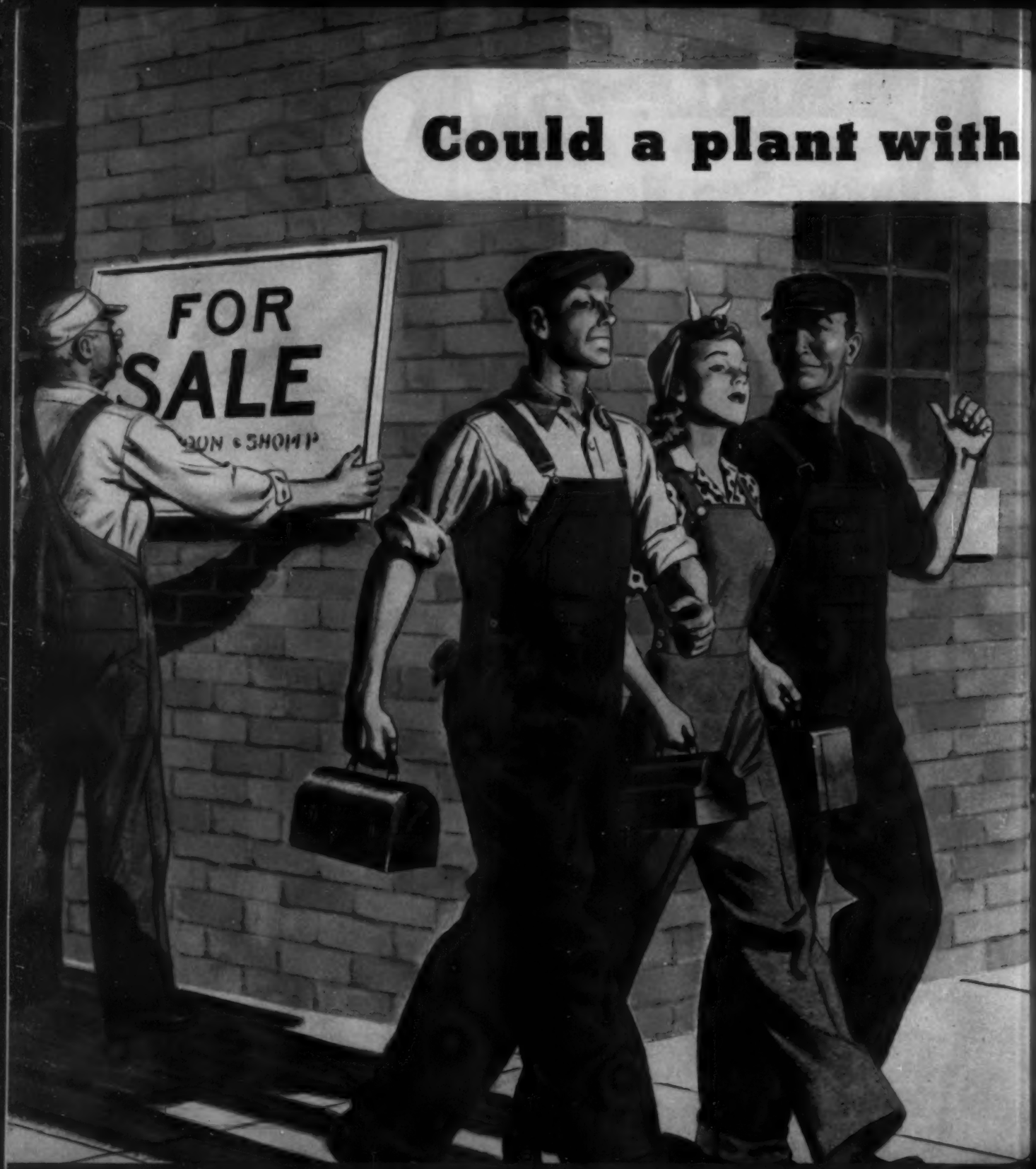
That's why you'll find Roebling "Blue Center" Steel Wire Rope on the job today where you find tough going like this. For with the know-how gained in more than 100 years of wire-rope engineering, Roebling men build into "Blue Center" the extra value that helps it meet the most difficult conditions unflinchingly. As battle-wise and work-wise as the "Sea Bees" themselves, "Blue Center" Rope is giving a fighting account of itself in thousands of installations—on cranes and bull-dozers and shovels, on ships and hoists and drilling lines.

ROEBLING
"Blue Center"
STEEL WIRE ROPE
PREFORMED OR NON-PREFORMED

ARE YOUR ROPES WORKING . . . OR FIGHTING TO WORK?

You can help your ropes work better, longer by relieving them of the necessity of *fighting* against worn sheaves, lack of proper lubrication, incorrect installation procedure . . . To help you do just that, Roebling has assembled a store of conservation data—summarized it on a handy 4 x 5 inch tag that you can put right onto your equipment. It's a simple, direct way of keeping your operating men constantly posted on the correct way of handling and using wire rope on the job. Copies of this tag are yours for the asking. Our nearest office will furnish you with as many as you need. Ask for Tag "A".

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY *Branches and Warehouses in Principal Cities*



Sturtevant Systems

REG. U. S. PAT. OFF.

AND EQUIPMENT

ENGINEERED FOR PRECISION-VENTILATING, HEATING, AIR CONDITIONING, DRYING, DUST AND FUME CONTROL, PNEUMATIC CONVEYING, MECHANICAL DRAFT

Bad Breath get by...in 194V?

IT IS NO IDLE DREAM that after this war every plant must pay more attention to indoor air. In the miracles that America's industrial production is performing lies a lesson for any far-seeing business executive.

Think of the countless new plants that have been completely air conditioned. Whether for 'plane engines or range finders, gas tanks or uniforms, Sturtevant Equipment has gone in, not for employees' comfort alone, but to turn out war goods faster, cheaper, more efficiently.

In aircraft engine factories, for example, plant weather is *ideal* for production, *consistent* for machining parts that must be the same as yesterday's and tomorrow's. As a result, absenteeism as well as scrapage is held to a minimum. In the manufacture of ultra-precision range finders, air conditioning makes possible assembly and test adjustments within tolerances never realized before—*a millionth of an inch.*

In weaving wool fibres into uniforms, air conditioning eliminates troublesome static sparks... maintains quality and weight that meet strict Government "specs". In making self-sealing gas tanks, air conditioning is on the job to carry off toxic solvents and eliminate the static sparks that might explode them.

And a thousand more products, each with a special reason why Sturtevant Air Conditioning went to work. Remember all of this modern plant space will still be in the picture after the war. And any manufacturer who is going to compete without *controlled indoor air* will be at a decided disadvantage.

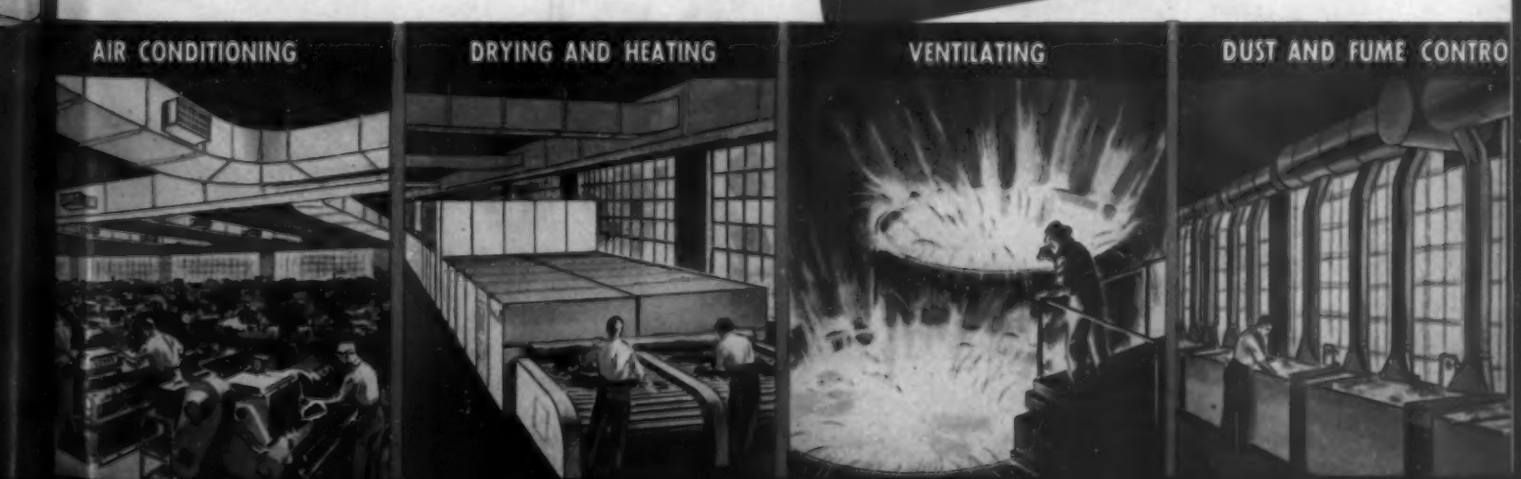
ENGINEERED AIR will make a difference...

Yes, in our post-war world, air will make the difference between profit and loss in many a plant—controlled air, engineered to serve efficiently—in all phases of industrial air conditioning, heating, ventilating, drying, dust and fume control, pneumatic conveying, and mechanical draft. And with new war-won knowledge, backed by experience as the pioneer in air-handling, Sturtevant will make available to you *engineered systems and equipment* that "Put Air to Work" with utmost efficiency and economy.

B. F. STURTEVANT COMPANY
Hyde Park, Boston, Mass. *Branches in 40 Cities*
B. F. Sturtevant Company of Canada, Ltd., Galt, Toronto, Montreal

STURTEVANT—FOUNDER OF THE AIR HANDLING INDUSTRY

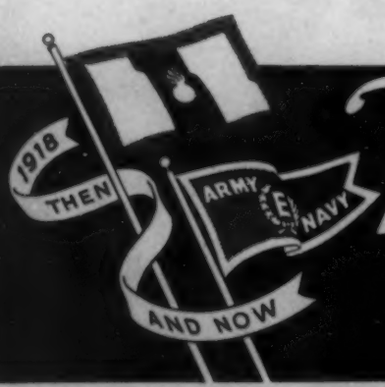
Sturtevant
REG. U.S. PAT. OFF.
Puts Air to Work



THEY *PITCH* PROPS

and *RUN* locks

It may be the tough spring that helps "feather" the variable-pitch propellor, or a simple spring that operates a door lock—the requirement is that it work when called on—unfailingly. Among other things, war teaches the folly of hit-or-miss methods. Springs can be designed to serve a definite purpose, indefinitely. No matter how simple or involved a mechanism may be, it deserves the best spring possible in material, design and manufacture.



Barnes-made Springs

ENGINEERED PEP AND POWER

WALLACE BARNES COMPANY

DIVISION OF THE ASSOCIATED SPRING CORPORATION

BRISTOL, CONNECTICUT

IN AMERICA'S GREAT PRODUCTION PLANTS . . .

At Thompson Aircraft Products Company, batteries of Acme-Gridley Automatics are attaining a degree of accuracy never before possible in mass production.

Millions of Parts—QUICK!

Two and three times faster than they have ever been produced before, metal parts in great variety, machined with the utmost precision—those are the demands of a war production greater than any nation has ever met!

Acme-Gridley Automatics are turning out these parts, at speeds and feeds limited only by the capacity of tools to stand up under 24-hour schedules.

These 4, 6 and 8-spindle machines are quickly adapted to many classes of work, often as many as 20 operations on a single set-up. Large tooling area speeds setting up. Operation is convenient, output is uniform, costs are low.

And when industry goes to work on the growing backlog of peace-time needs, Acme-Gridleys will be ready to carry their full share of the load—at lower costs than ever before.

THE NATIONAL ACME CO

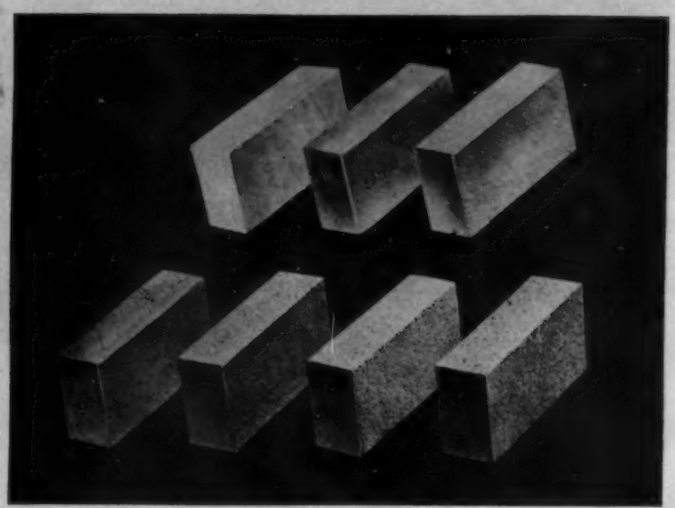
170 EAST 131ST STREET • CLEVELAND, OHIO

ACME-GRIDLEY 4-6 AND 8 SPINDLE BAR AND CHUCKING AUTOMATICS • SINGLE SPINDLE AUTOMATICS • AUTOMATIC THREADING DIES AND TAPS • SCREW MACHINE PRODUCTS • THE CHRONOLOG • LIMIT SWITCHES • POSITIVE CENTRIFUGE • CONTRACT MANUFACTURING

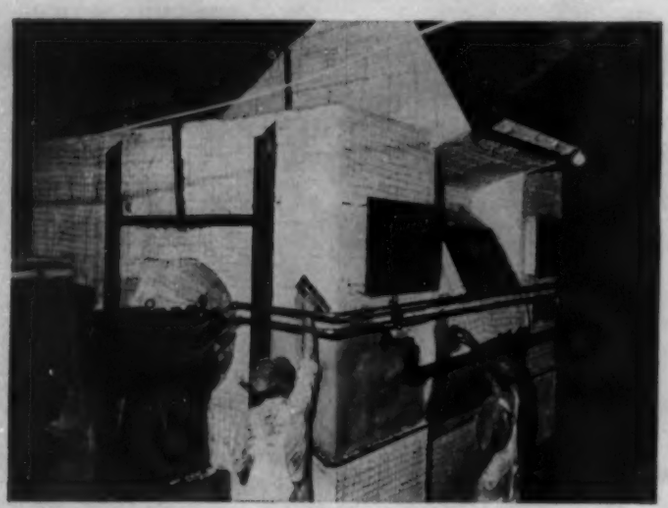
Meet wartime conservation demands with

Johns-Manville Insulations

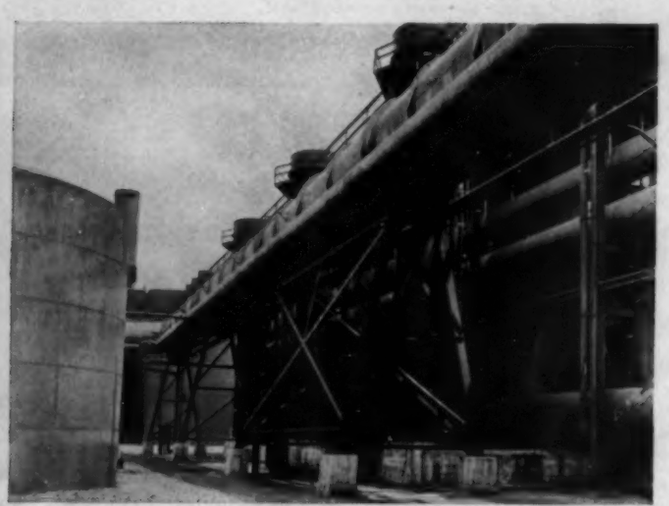
INSULATION FOR TEMPERATURES TO 1900° F. J-M Superex Blocks have long been standard for this service. High heat resistance, low thermal conductivity. Sizes 3" x 18", 6" x 36" and 12" x 36"; from 1" to 4" thick.



FURNACE INSULATION UP TO 2600° F. J-M Insulating Brick and Insulating Fire Brick are available in 7 types, with temperature limits ranging from 1600° F. to 2600° F. All provide light weight, low conductivity.



POWER PLANT INSULATIONS. J-M 85% Magnesia has been for many years the most widely used block and pipe insulation for temperatures to 600° F. and, in combination with Superex, for higher temperatures. Maintains high insulating efficiency. Standard block sizes 3" x 18", 6" x 36" and 12" x 36"; from 1" to 4" thick.



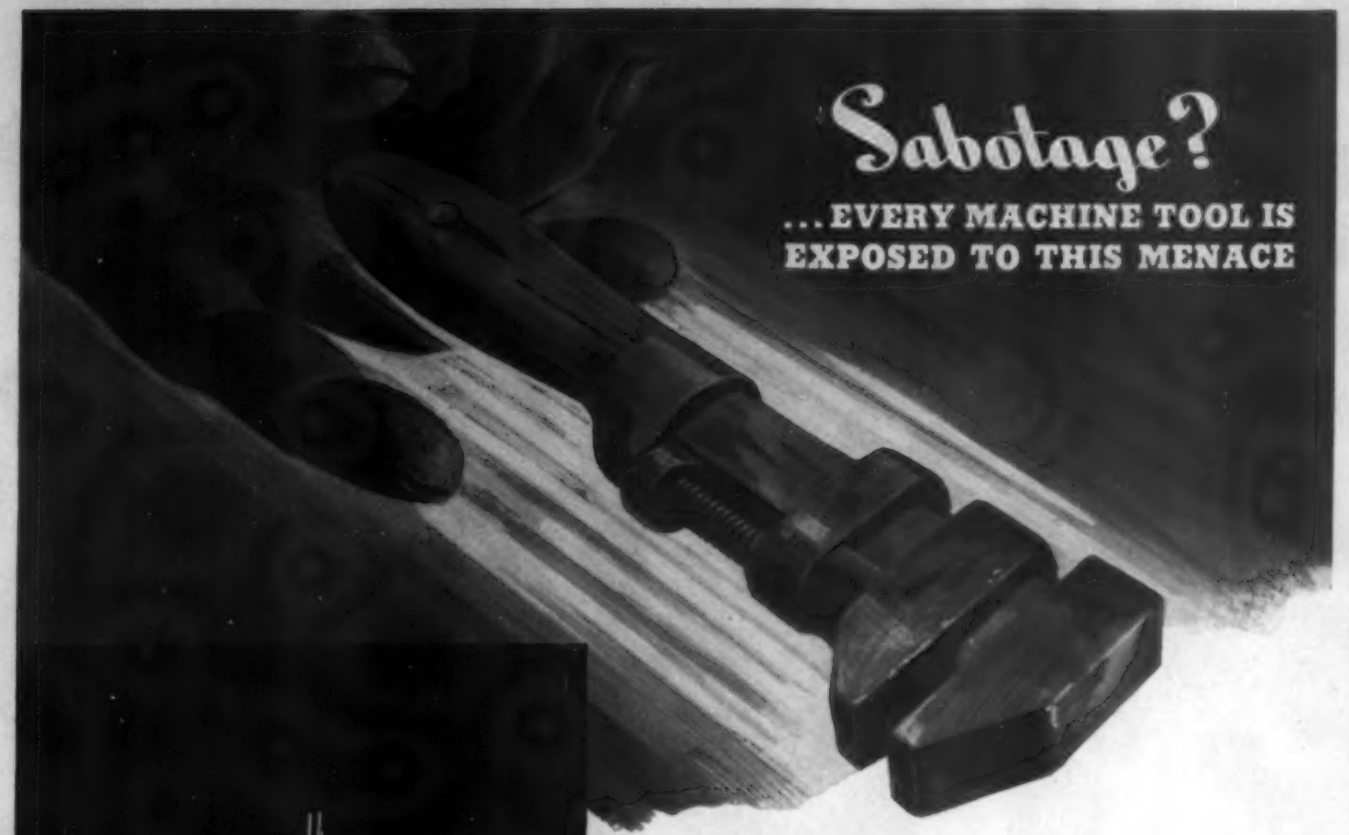
FOR STEAM LINES UP TO 700° F. J-M Asbesto-Sponge Felted Pipe Insulation is recommended where maximum efficiency, high salvage and resistance to abuse are essential. For temperatures over 700°, used in combination with Superex. It is available in 3-ft. lengths, from 1" to 3" thick, for standard pipe sizes.

JOHNS-MANVILLE

Industrial Insulations

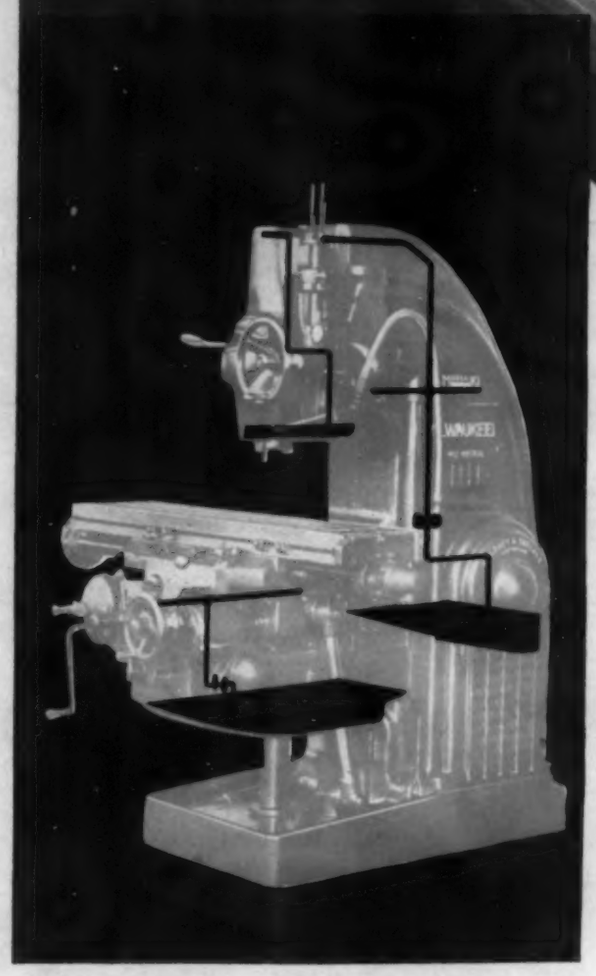
FOR EVERY TEMPERATURE . . . FOR EVERY SERVICE

FOR DETAILS on these materials, and on the complete J-M Insulation line, write for Catalog GI-6A. Johns-Manville, 22 East 40th Street, New York, N. Y.



Sabotage?

...EVERY MACHINE TOOL IS EXPOSED TO THIS MENACE



YES — "sabotage" is ever present even with every machine running smoothly — in step with the swift pace of wartime production — "Sabotage" in the form of excess wear in closely fitted parts — bearings — gear trains. And wear quickly shortens the production life of the machine tool — impairs accuracy — takes it out of action.

Such wear is most likely to occur under the peak loads of high production, unless the machine tool is equipped with self protection — adequate and automatic lubrication of all vital parts.

Automatic lubrication in Milwaukee Milling Machines is assured by pressure pumps in the column and knee of horizontal machines and in the sliding head of vertical machines. Only a minimum of attention is needed to keep the machine at full lubricating efficiency.

Buy Victory with at Least 10% in War Bonds

KEARNEY & TRECKER
CORPORATION
MILWAUKEE, WISCONSIN

Milwaukee **MACHINE TOOLS**

The "General" says:

"LET'S "STEEL" OURSELVES FOR WINNING A VICTORY ASSURING LIBERTY AND JUSTICE FOR ALL"

and Here's *HOW*–

V

Buy U.S. War Bonds and Stamps Today.. NOW!

and Now for Immediate Warehouse Shipments

Call GENSCO *for*

COLD FINISHED BARS
COLD ROLLED STRIP STEEL
COLD ROLLED SHIM STEEL
SHEET STEEL
TEMPERED and ANNEALED SPRING STEEL
ROUND EDGE FLAT WIRE
ROUND WIRES
DRILL ROD
STEEL BALLS
FEELER GAUGE

GENERAL STEEL WAREHOUSE CO. Inc.

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441 Lexington Ave.
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3844 W. Wisconsin Ave.
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1280 Amherst Place
Cabany 3397

Immediate WAREHOUSE SHIPMENTS

War plants are obtaining more production per man-hour with Niagara Power Squaring Shears because of accurate cutting, quick setting, ball bearing, self-measuring parallel back gages, full visibility of cutting line, instant acting Niagara sleeve clutch and other modern features.

Enclosed drive with gears, clutch and eccentrics running in oil assure long life and low maintenance cost. Four-edge, solid tool steel knives are standard equipment. Niagara Machine & Tool Works, Buffalo, N. Y. District Offices: Detroit, Cleveland, New York.

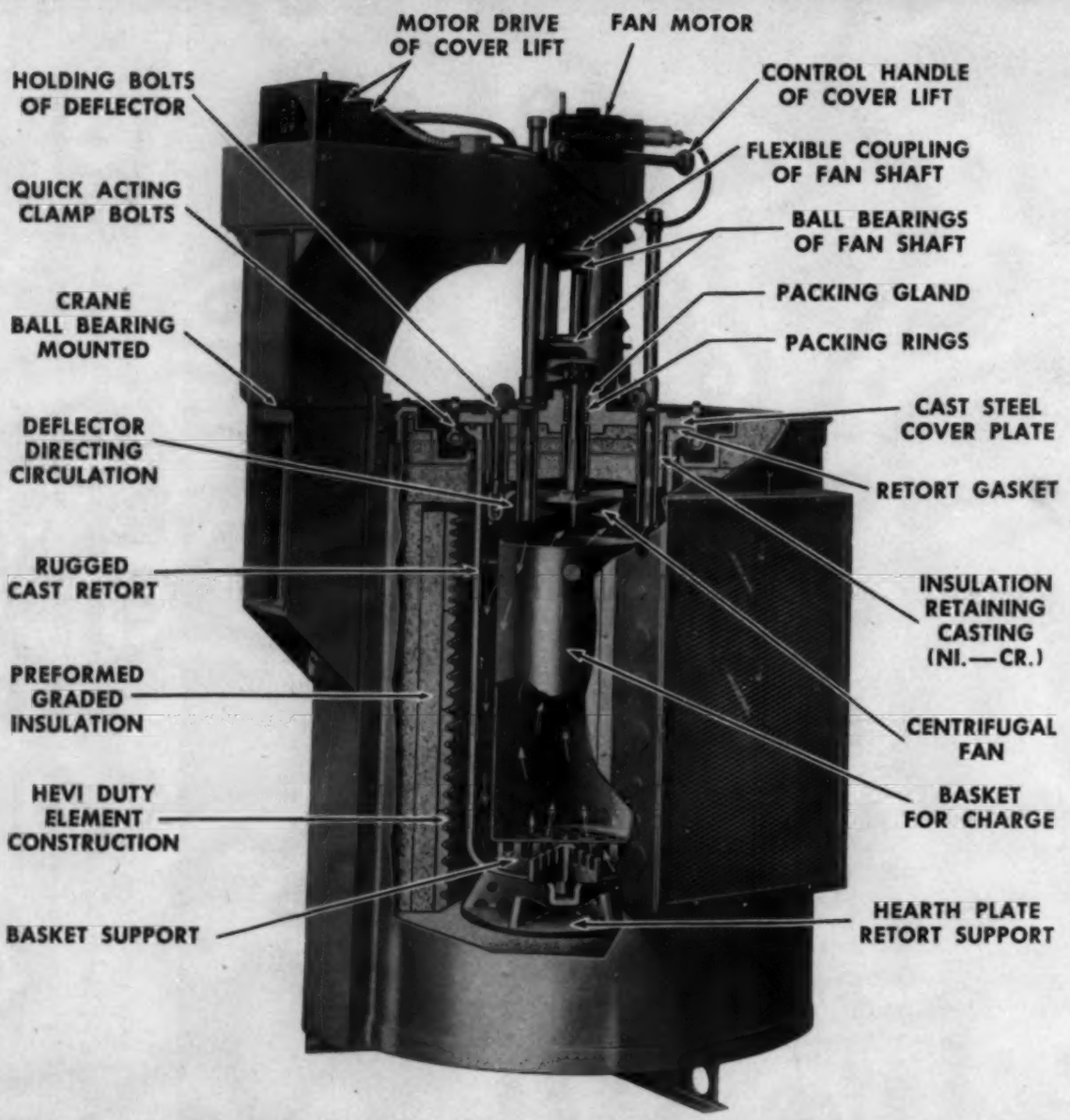
Shear knives available for cutting alloy and special steels. Let us know what you desire to cut. Prompt delivery on spare knives for Niagara Squaring Shears. Also factory re-grinding service by the same skilled men who grind new Niagara knives. **—Advt.**

BUY UNITED STATES WAR BONDS AND STAMPS

5 Standard Uses of THE HEVI DUTY CARBURIZER

● CARBURIZING ● NITRIDING ● DRY CYANIDING
● BRIGHT ANNEALING ● CLEAN HARDENING

A Versatile Tool for Production Heat Treating



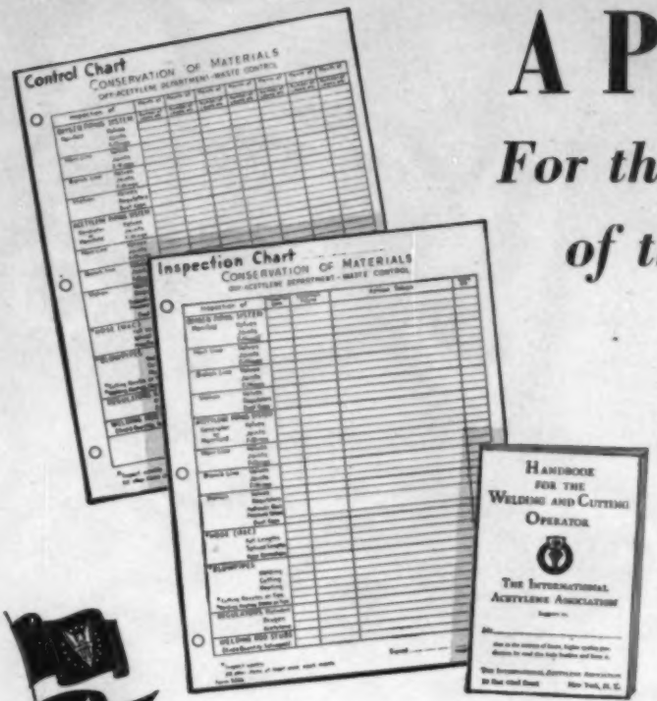
Typical Construction of the Hevi Duty Carburizer

Send for Bulletin HD 142

HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES HEVI-DUTY ELECTRIC EXCLUSIVELY

MILWAUKEE, WISCONSIN



A PLANNED PROGRAM

For the Control of Waste in use of the Oxy-Acetylene Process

MARITIME "M" AWARD FOR OUTSTANDING PRODUCTION ACHIEVEMENT

The greatest over-all losses of oxygen and acetylene come from little things at many points—such as small leaks at fittings, leaky hose, and minor faults of operators, both experienced and new. An effective method for control of such waste must strike at each one of these small points.

Elimination of leaks and wasteful practices requires a planned program, the responsibility for which must be shared equally by management and operators. To help put such a program into effect, the Linde organization suggests the following plan be adopted—modified as needed to fit each shop.

1. **Appoint an inspector** to check regularly the piping system, the hose, and the apparatus while the equipment is in operation. Besides soapy water and a brush to test for leaks, wrenches, and a simple repair kit, he should have some form of INSPECTION CHART such as that shown above and a map of the oxy-acetylene system on which to record tests, repairs, and other pertinent information. *Sample copies of this chart (Form 5206), and of a map (Form 5207), will be sent by Linde without charge.*

2. **Summarize the inspection data** on a master CONTROL CHART such as that shown above. This will give plant executives an over-all picture of the waste control program. *Copies of this chart (Form 5205) are available from Linde.*

3. **Co-operation of every operator** should be solicited for the success of this waste control program. To remind operators of the many little ways in which waste can be avoided, Linde will send as many copies as you need of a vest-pocket-sized booklet, published by the International Acetylene Association, that presents the conservation story in a series of illustrated "do's" and "don't's." *Every operator should have a copy of this little handbook.*

The program outlined above will not only help to assure continued adequate supplies of oxygen and acetylene, but should also more than pay for itself in lowered costs and increased efficiency. For samples of the charts described above, and for handbooks for your operators, send the coupon, or ask any Linde office.

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

30 East 42nd Street
New York, N. Y.

UCC

Offices in Principal Cities

In Canada: Dominion Oxygen Company, Limited, Toronto

THE LINDE AIR PRODUCTS COMPANY
30 East 42nd St., Room 308. New York, N. Y.

Please send me, without charge, the material I have checked.

☐ Conservation of Materials—Inspection Chart—Form 5206.

☐ Specimen Inspectors' Map of Oxy-Acetylene Piping System—Form 5207.

☐ Conservation of Materials—Control Chart—Form 5205.

☐ Handbook for the Oxy-Acetylene Operator—published by the International Acetylene Association.

(Specify the quantity of Handbooks required) .....

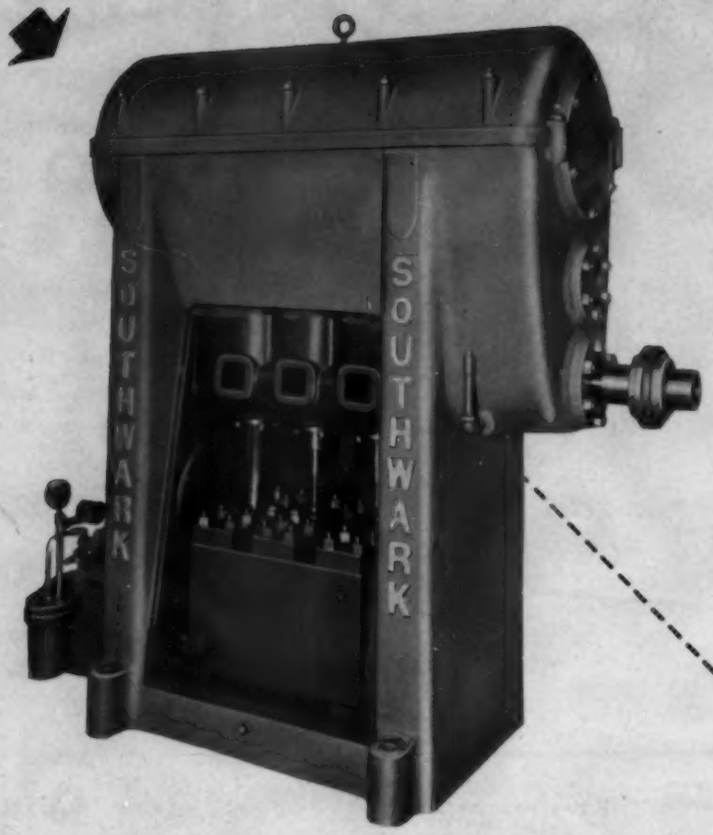
Name .....

Street and No. .....

City and State .....

LINDE OXYGEN . . . PREST-O-LITE ACETYLENE . . . UNION CARBIDE
OXWELD, PUROX, PREST-O-WELD APPARATUS . . . OXWELD SUPPLIES

The words "Linde," "Prest-O-Lite," "Union," "Oxweld," "Purox," and "Prest-O-Weld" are trade-marks.



High Pressure Pumps

Southwark's line of High Pressure Triplex Pumps have been thoroughly tested in actual service. Sound design and substantial construction have earned for these pumps a reputation for long life, low maintenance and high overall efficiency.

For delivering large volumes of water in conjunction with hydraulic press installations, horizontal pumps are built in 12-, 15-, and 18-in. stroke lengths. A 3-plunger arrangement provides a 60 degree overlap in discharge impulses and tends to smooth out pump pulsations.

The 12-in. stroke pump discharge ranges from 23 gpm at 7,500 lb per sq in. to 170 gpm at 1,000 lb per sq in.; that of the 18-in. stroke unit from 88 gpm at 7,500 lb per sq in. to 685 gpm at 1,000 lb per sq in. Other capacities and corresponding pressures are available.

Where a smaller capacity pump is required, the vertical pump—illustrated—is offered. Their capacities range from 2 to 100 gpm at pressures from 15,000 to 1,000 lb per sq in. respectively.

Write for Bulletin P-106 which contains a complete description of these pumps with tables showing dimensions, capacities and power requirements.

Baldwin Southwark Division, The Baldwin Locomotive Works, Philadelphia; Pacific Coast Representative, The Pelton Water Wheel Co., San Francisco.

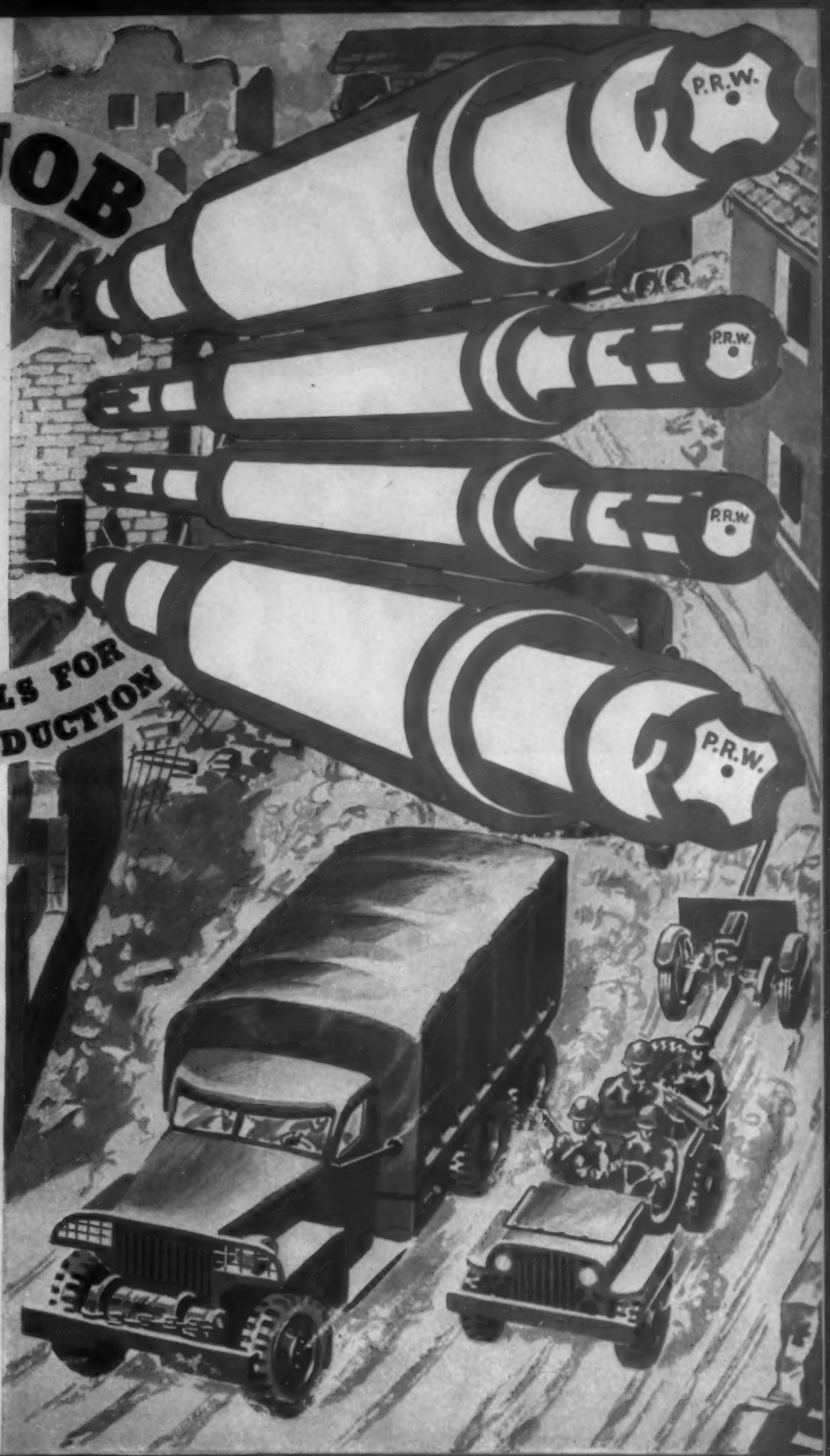
BLW THE BALDWIN GROUP

BALDWIN SOUTHWARK

Division THE BALDWIN LOCOMOTIVE WORKS, *Philadelphia, Pa.*

OUR JOB

BETTER ROLLS FOR GREATER PRODUCTION



Rolling Mills depend upon Phoenix Rolls to fulfill a definite and very important part in the war program with unflagging perseverance. This confidence is indeed warranted by the performance of these rolls under unusual operating conditions.

PITTSBURGH ROLLS

PITTSBURGH ROLLS DIVISION of
SLAW-KNOX CO.—"Steel's Partner" • PITTSBURGH, PA.

Enlarged reproduction free on request

Wire that's full of 'Fire'

A while ago billions of feet of Wissco wire a year were striving only to make life better. Now, fighting mad, the Wissco wire that streams through our blast furnaces, open hearths and seven mills is contributing its efficiency to

War planes	*Army trucks*	*Submarines*
Instruments	*Jeeps*	*Torpedoes*
Parachutes	*Scout cars*	*Machine guns*
Trainers	*Destroyers*	*Automatics*
Tanks	*Cruisers*	*Gun carriages*

If YOU have a war need that Wissco quality wire can help to meet, rush your specifications and priority rating to us. Here at wire headquarters you'll find *everything in wire:* high and low carbon wire, round and flat wire, wire for springs, for wire rope, for use in scores of industries, in a variety of sizes, tempers, grades and finishes. Wickwire Spencer Steel Company, 500 Fifth Avenue, New York; Buffalo, Chicago, Detroit, Philadelphia, San Francisco, Worcester.

CONTINUOUS RESEARCH during 122 years of wire manufacture has enabled Wissco to help its customers find answers to all sorts of wire applications.

SEND YOUR WIRE QUESTIONS TO WICKWIRE SPENCER

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WISSCO WIRE

BY WICKWIRE SPENCER

WISSCO PRODUCT

4500 TONS

respond to the "Feminine Touch"

This huge 4,500-ton Birdsboro Hydraulic Press is one of the biggest pieces of equipment at Republic Aviation Corporation. But, despite its gigantic size and power, it responds to feminine hands just as readily as a sewing machine.

Thus, through Birdsboro's skill in press design and press making, another vital war plant is helped to carry on in spite of current shortage of the manpower so urgently needed to meet the requirements of war-pressed industry.

If *you* have a press problem, it will pay you to consult Birdsboro. Our engineers will be glad to work with yours, right down the line—from planning to designing to completion.

BIRDSBORO STEEL FOUNDRY & MACHINE COMPANY, BIRDSBORO, PENNSYLVANIA

BIRDSBORO

HYDRAULIC PRESSES

U. S. Army Signal Corps Photo

HERE'S SOMETHING TO HELP YOU *Clear the Air*

HANDBOOK OF SPECIAL STEELS

Newly revised and reprinted—a comprehensive book on the properties, uses, and best methods of handling, treatment, etc. of tool, stainless and other alloy steels. Plenty of tables to facilitate quick reference and selection. 128 pages, pocket-sized, latest data.

ELEMENTARY DISCUSSIONS: TOOL AND STAINLESS STEELS

Informative booklets giving clear, detailed data on the various types of tool and stainless steels, their properties and handling. Excellent for training courses in metals and metalworking.

THE lack of information can throw a pretty effective smokescreen around jobs on the production lines. After all, it's about the same as on the firing line—you can't hit them if you can't see them.

Your plant is probably no exception to the general run of war producers. All have a steady job on their hands of training a stream of new men and apprentices in specialized machine operations or other fabricating procedures. Where the needed information concerns alloy steels, you'll find invaluable the publications listed in the panel to the left.

They're primarily for production men. For engineers and designers, complete and certified technical data on the various types of stainless and tool steels is available in Allegheny Ludlum "Blue Sheets." ● Write for the help you need.

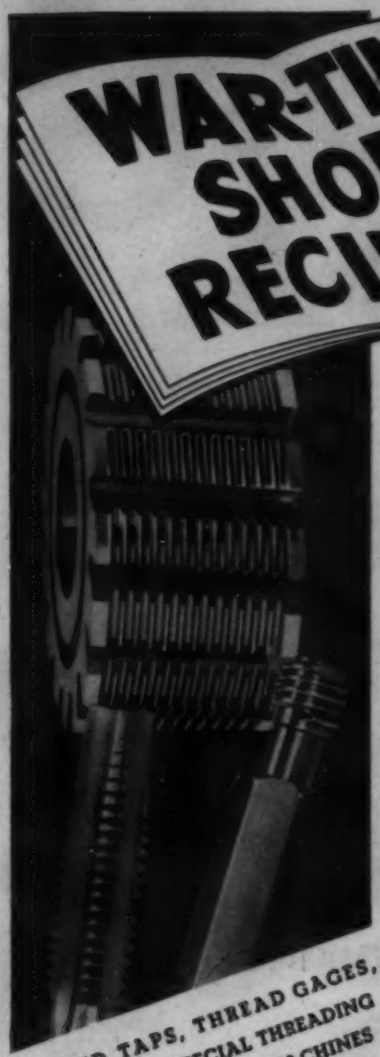
ADDRESS DEPT. S-3

Allegheny Ludlum
STEEL CORPORATION
BRACKENRIDGE, PENNSYLVANIA

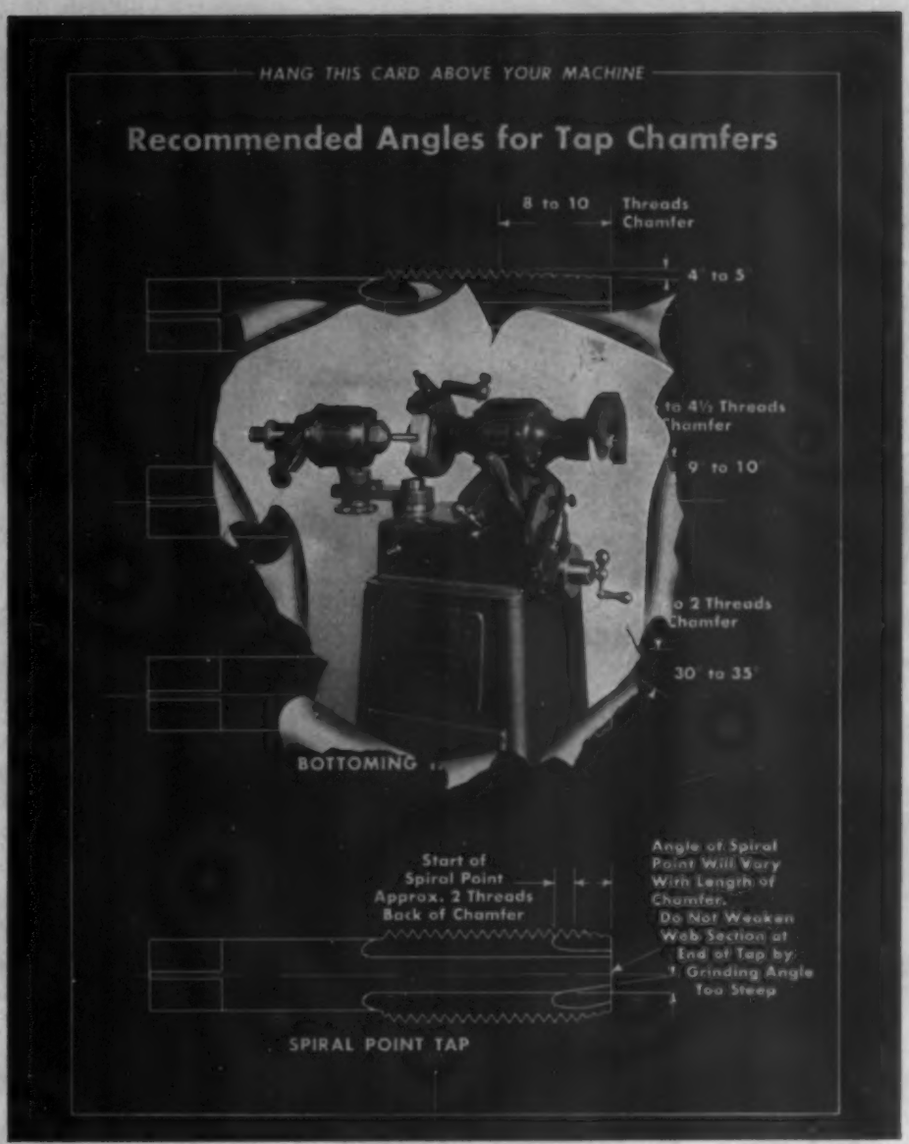
A-8836 . . W & D

WAR-TIME SHOP RECIPES

#2 for thread production



GROUND TAPS, THREAD GAGES, THREAD HOBS & SPECIAL THREADING TOOLS. SPECIAL TAPPING MACHINES


HANG THIS CARD ABOVE YOUR MACHINE
Recommended Angles for Tap Chamfers
8 to 10 Threads Chamfer
4° to 5°
to 4½ Threads Chamfer
9° to 10°
o 2 Threads Chamfer
30° to 35°
BOTTOMING
Start of Spiral Point Approx. 2 Threads Back of Chamfer
Angle of Spiral Point Will Vary With Length of Chamfer. Do Not Weaken Web Section at End of Tap by Grinding Angle Too Steep
SPIRAL POINT TAP

TAKE (1) All your dull or worn taps
(2) "Detroit" Tap reconditioning wall chart, as illustrated
(3) "Detroit" Tap Reconditioner

Then grind taps on the Reconditioner according to instructions on the wall chart and put them back to work — as good as new.

If you don't have a copy of this wall chart, write for one today *on your company letterhead*. Ask for Chart No. RTC.

DETROIT TAP & TOOL CO.

8432 BUTLER STREET, DETROIT, MICHIGAN, U. S. A.

New, Quick Change-over OF TIMING CONTROL

KEEPS RESISTANCE WELDERS IN ACTION!

With the new Westinghouse Electronic Weld Timer you can change complete timing panel for any of 18 different resistance weld operations —in less than three minutes!

The entire timing panel, for example, is released by a single thumb screw. It has an exclusive swing-out design, with special "hingeless-hinge" and snap-hook chains for easy removal and replacement. All connections to the main transformer panel are made by plug and receptacle. No special wiring is needed.

Cabinet for all controls is standard, but timing panels are available in 18 NEMA types as either:

Automatic Weld Timers — to control timing weld current and electrode operation where synchronous control is not required.

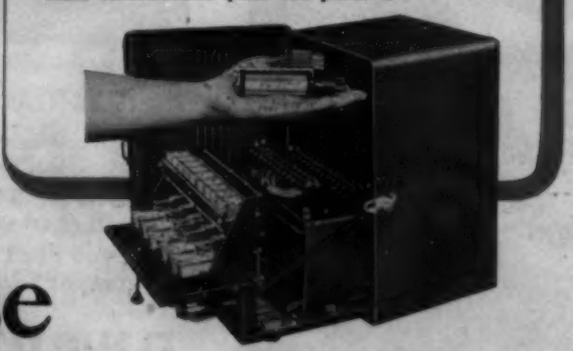
or *Sequence Timers* — to control only sequence of electrode operation where duration of weld current is adjusted by Synchronous Control.

Today's welding production calls for action. Write for Bulletin 3079. It tells you how to increase the adaptability of your resistance welders. Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, Department 7-N.

J-21190

PLUG-IN TYPE RELAYS
...replaced in 10 seconds!

A typical example of how the new Westinghouse design speeds maintenance is the special type of plug-in relays. All wiring work is eliminated. Just pull out the old relay, insert a new one—and you're ready to go! Color coded relay base and sockets make identification quick and positive.



Westinghouse

RESISTANCE WELDING CONTROL

TURNING *Minutes* INTO MUNITIONS . . . . WITH SIMPLIMATICS

They're hard at it, these Simplimatics—giving added impetus to the unrelenting offensive in motion all the way between machine shops and enemies' lines.

Miracles in machining are made possible with the Simplimatics wherever large volume is required. Their automatic operation, speed and accuracy eliminate the need for highly skilled hands.

GISHOLT MACHINE COMPANY

1217 East Washington Avenue, Madison, Wisconsin

LOOK AHEAD . . . KEEP AHEAD . . . WITH GISHOLT IMPROVEMENTS IN METAL TURNING

GISHOLT

TURRET LATHES · AUTOMATIC LATHES · BALANCING MACHINES

At Gisholt, the Army-Navy "E" and the Treasury Flag fly side by side

NO PREVIOUS WAR EVER SAW A ROAD-BUILDING JOB LIKE THE NEW ALCAN HIGHWAY...

nor the modern *Preformed wire rope*

THAT HELPED BREAK ALL RECORDS

Short cut to Japan—this 1,681-mile, 30-foot wide military artery for troop transport and supplies—a colossal task, bridging and crossing 200 streams, was completed in advance of schedule.

And every foot of the way, helping to accomplish the impossible, Preformed Wire Rope was on the job—lifting and swinging the giant shovels and grab-buckets biting away the tons of rock and soil, manning the booms that swung bridge-timbers and plates into place, winching trucks out of gullies and gravel pits.

Preformed Wire Rope—with its greater flexibility and stamina, easier handling, longer life, fewer shutdowns for replacements, and cost reducing—*proved* through years of peacetime performance in industry that it was made to order for the toughest wartime jobs.

Ask your own wire rope manufacturer or supplier

DoAll PRECISION GRINDER

Smooth AS A MIRROR EVERY TIME

● Especially designed and built with one purpose—to do the difficult task of super accurate grinding, so essential in our mass production program of today which calls for interchangeability of hundreds of vital parts.

The engineers worked for years to refine DoAll performance. Vibration is practically eliminated through rugged construction. Bearings are of larger area and hand scraped. Every part is so perfectly coordinated that you are assured of accuracy not only to size, but to flatness and parallelism.

GRINDING AT ITS BEST

For that final operation—a smooth, mirror-like finish—a finish that will pass every rigid inspection test — that will make a surface accurate to less than a ten thousandth of an inch, investigate the DoAll.

When the finish is so perfect that you can actually "wring" two flat surfaces together — well, that's super grinding — and that's what the DoAll has to offer. Adaptable to either wet or dry grinding.

Send for descriptive literature.

SAVAGE TOOL COMPANY
Dept. 5 **Savage, Minn.**

DoAll Offices in 25 cities, each in charge of a trained sales engineer to give you quick service on Surface Grinders, Gage Blocks, DoAll Contour Machines, DoAll Band Saws and Files.

DoAll CONTOUR MACHINES

Under $2000 Under $8500 Under $3000 Under $1500 Under $1000
All models with Motors

DoAll BAND SAWS

100 feet in each Slitz-Out Contour

DoAll GAGE BLOCKS

The Measure Blocks of 5000 Inch used in Inspection Workrooms, Toolrooms, Tool and Laboratory Set.

Each set composed of 87 accurate blocks

AND NOW!

H-W MAGNAMIX

A Ramming Mixture of Washington Magnesite

FOR

BASIC OPEN-HEARTH & ELECTRIC STEEL FURNACE BOTTOMS

The widespread introduction of H-W Magnamix into steel plant practice was of necessity delayed for more than two years pending the completion of long range plans for increasing the production of domestic magnesite. During the interval the promise shown by chemical and physical tests in the course of laboratory development has been confirmed in actual service, first in basic electric steel furnace bottoms and, more recently, in the bottoms of basic open-hearth steel furnaces. The same degree of confidence may be placed in H-W Magnamix as in the many other Harbison-Walker products which are so well established throughout the steel industry.

COMPOSITION

H-W Magnamix contains approximately 80 percent of magnesia, largely in the stable crystalline form periclase, which accounts for its high refractoriness. It is installed as received save the addition of water. The high magnesia content is not diluted by the addition of furnace slag.

QUALITY

Laboratory control and constant supervision of manufacture insure uniform quality and excellent working properties.

PREPARATION

H-W Magnamix requires only the additon of five to six pints of water per 100 pounds to bring it to the consistency of damp foundry molding sand which is ideal for ramming purposes.

STRENGTH

Furnace bottoms of rammed H-W Magnamix after drying have a density of 165 to 170 pounds per cubic foot, a crushing strength of over 1500 pounds per square inch, and a modulus of rupture of over 350 pounds per square inch.

ECONOMY

H-W Magnamix hearths are rapidly installed with common labor. Complete open hearth bottoms have been placed at the rate of over two tons per hour with less than five man-hours of labor per ton. The ramming of an H-W Magnamix bottom may begin immediately upon the completion of a furnace roof and proceed simultaneously with the construction of ports and end walls, and repairs to regenerators. The desired contour of the hearth and the working surface are established completely before any heat is applied. The furnace refractories are spared the severe treatment to which they are subjected in furnaces with bottoms sintered into place in successive layers.

H-W Magnamix is shipped dry in sacks of 100 pounds each. Shipments are made in full carloads or in mixed carloads with H-W Magnesite, H-W Chrome, H-W Improved Metalkase Magnesite, Magnex, Chromex or Forsterite brick.

TRADE MARK

REG. U. S. PAT. OFF.

HARBISON-WALKER REFRACTORIES COMPANY

and subsidiaries

WORLD'S LARGEST PRODUCER OF REFRACTORIES

GENERAL OFFICES · PITTSBURGH, PENNSYLVANIA

This advertisement is one of a series appearing regularly in national periodicals, farm publications, and prominent city newspapers. Reprints in full color are available for your use. Write us for them.

Reproduced from a full-color painting by Douglass Crockwell for Republic Steel.

"Now . . . if I was down there in Washington . . ."

That's Joe talking. Every night when he stops in for his coffee and sinkers he has plenty to tell the boys about how this war should be run. Maybe he's right and maybe he isn't.

The important thing is that he can say what he thinks—out loud. Right in front of Tom Burke, the cop. He couldn't do that in Germany or Japan or Italy . . . or in any of the nations that have been "liberated" by the New Order.

But Joe is an American.

★ ★ ★

And because Joe is an American, he has more privileges—*and more opportunities*—than can be found anywhere else in the world.

If he doesn't want to work for somebody else, he can operate a business of his own—anywhere. Joe is a free agent. His future is under his hat. Like millions of other Americans on the way up, Joe can cash in on a way of life that has brought America the highest standards of living in the world—by a big margin.

It is a typically *American* way of life—based on American ingenuity, ambition, desire to get ahead. It gives every person a chance.

That is why today, after a comparatively short time, teamwork and cooperation in American industry and American agriculture are performing miracles of production that would be impossible in a country weakened by years of regimentation and dictatorship.

That is why the steel industry—in which Republic holds a leading position—has been able to "come through" with the steels and steel products for our Nation's gigantic armament and shipbuilding programs. In 1942 Republic operated at 99.5% of capacity for the entire year. And the nearly 70,000 Republic men and women supporting our fighting forces* beat the 1941 record by 479,000 tons.

That, too, is why Republic chemists, metallurgists and engineers are constantly searching for—and finding—new and improved ways of making finer steels.

And that is why you can look with faith to the future—when victory will insure our *free* way of life—when you and we can return to the job we want to do most—produce peacetime products to make America a better, happier, safer place in which to live.

Until then, we have a big job to do. LET'S DO IT WELL and get it finished in a hurry. And let's guard faithfully our American way of life!

**Over 13,000 Republic men are now in uniform.*

REPUBLIC STEEL CORPORATION

General Offices: Cleveland, Ohio

Berger Manufacturing Division • Culvert Division
Niles Steel Products Division • Steel and Tubes Division
Union Drawn Steel Division • Truscon Steel Company
Export Department: Chrysler Building, New York, N.Y.

Republic

SHEETS AND PLATES

Alloy and Enduro Stainless Steels, Pipe, Upson Bolts—Nuts—Rivets, Electrunite Boiler Tubes, Mechanical Tubing.

Rx FOR VICTORY

SCRAP SCRAP MORE SCRAP

Ninety million tons of steel in 1943. That's what the doctor ordered to hasten the Axis demise. But to produce 90 million tons the mills must have 45 million tons of scrap metal. Regular sources of supply account for only half that amount. The remaining tonnage must come from scrap metal now lying around factories, garages, homes, farms.

How quickly we terminate this war depends on our ability to outproduce our enemies. And, according to no less an authority than Donald M. Nelson, "Nothing is more important to war production than scrap." Any relaxation in salvaging scrap would sabotage our entire war effort. Do your part in filling the victory prescription.

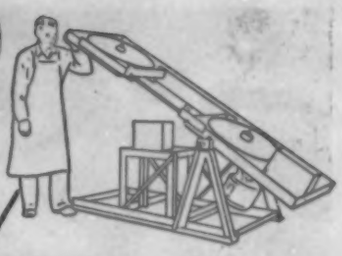
THE ANDREWS STEEL CO.
NEWPORT, KENTUCKY

DIVISIONS
THE NEWPORT ROLLING MILL COMPANY
THE GLOBE IRON ROOFING & CORRUGATING CO.

Wells SAWS
THE SIGN OF SERVICE

No. 9
General Foundry Saw.

No. 20
Designed for cutting risers off propeller blades.



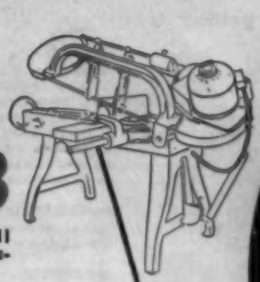
No. 5
Ideal tool room size.

Wells

Fast-Accurate-Rugged

METAL CUTTING BAND SAWS

No. 8
Popular all around production Saw.



No. 12
Heavy duty production Saw.

SAW BLADES
Available at all times.

STOCK STANDS
Indispensable item for your shop.

WELLS METAL CUTTING BAND SAWS are engineered and designed for dependable long service in metal cutting efficiency, meeting the exacting requirements of present day demands on industry.

Whatever your metal cutting jobs are, call your distributor or write direct.

Wells Has Established Leadership

FREE NEW CATALOG on WELLS complete line is yours on request. Write or wire today.

WELLS MANUFACTURING CORPORATION

Wells **METAL CUTTING BAND SAWS**

1515 FILLMORE STREET • THREE RIVERS, MICHIGAN

He learned about Galvanizing on the bottom of 'Frisco Bay!

There, deep below the surface, immersed in a constant bath of corrosive sea water, lay the steel pipe of a water supply line. That pipe, HOT-DIP GALVANIZED before it was laid in 1902, is still in good condition after 40 years of uninterrupted service! HOT-DIP GALVANIZING gave it the thickest possible coating of protective zinc, and saved the taxpayers large sums of money in maintenance and replacement expense. There are other methods of galvanizing, but only HOT-DIP GALVANIZING provides a thick zinc coating fused inseparably to the metal beneath—the most economic rust protection known to modern science. American Hot Dip Galvanizers Association, Inc., First National Bank Bldg., Pittsburgh, Pa.

"If it carries this seal it's a job well done."

Buy from the qualified members listed below and KNOW you are getting a genuine HOT-DIP job.

CALIFORNIA
LOS ANGELES GALVANIZING CO., HUNTINGTON PARK
EMSCO DERRICK & EQUIPMENT CO., LOS ANGELES
JOSLYN CO. OF CALIFORNIA, LOS ANGELES
WESTERN GALVANIZING COMPANY, LOS ANGELES
HUBBARD & CO., OAKLAND
JOHN FINN METAL WORKS, SAN FRANCISCO
SAN FRANCISCO GALVANIZING WORKS, SAN FRANCISCO

CONNECTICUT
WILCOX, CRITTENDEN & COMPANY, INC., MIDDLETOWN

GEORGIA
ATLANTIC STEEL CO., ATLANTA

ILLINOIS
EQUIPMENT STEEL PRODUCTS DIVISION OF UNION ASBESTOS AND RUBBER CO., BLUE ISLAND
JOSLYN MFG. & SUPPLY CO., CHICAGO
STANDARD GALVANIZING CO., CHICAGO

MAINE
THE THOMAS LAUGHLIN CO., PORTLAND

MARYLAND
SOUTHERN GALVANIZING COMPANY, BALTIMORE

MICHIGAN
RIVERSIDE FOUNDRY & GALVANIZING CO., KALAMAZOO

MINNESOTA
LEWIS BOLT & NUT CO., MINNEAPOLIS

MISSOURI
COLUMBIAN STEEL TANK CO., KANSAS CITY
MISSOURI ROLLING MILL CORP., ST. LOUIS

NEW JERSEY
DIAMOND EXPANSION BOLT CO., INC., GARWOOD
L. O. KOVEN & BROTHER, INC., JERSEY CITY
INDEPENDENT GALVANIZING COMPANY, NEWARK

NEW YORK
ACME STEEL & MALLEABLE IRON WORKS, BUFFALO
BUFFALO GALVANIZING & TINNING WORKS, INC., BUFFALO
THOMAS GREGORY GALVANIZING WORKS, MASPETH, (N. Y. C.)
ATLANTIC STAMPING CO., ROCHESTER

OHIO
THE WITT CORNICE COMPANY, CINCINNATI
THE FANNER MFG. CO., CLEVELAND
THE NATIONAL TELEPHONE SUPPLY CO., CLEVELAND
THE SANITARY TINNING CO., CLEVELAND
INTERNATIONAL-STACEY CORP., COLUMBUS
COMMERCIAL METALS TREATING, INC., TOLEDO

OREGON
GALVANIZERS, PORTLAND

PENNSYLVANIA
LEHIGH STRUCTURAL STEEL CO., ALLENTOWN
AMERICAN TINNING & GALVANIZING CO., ERIE
PENN GALVANIZING CO., PHILADELPHIA
HANLON-GREGORY GALVANIZING CO., PITTSBURGH
OLIVER IRON & STEEL CORPORATION, PITTSBURGH

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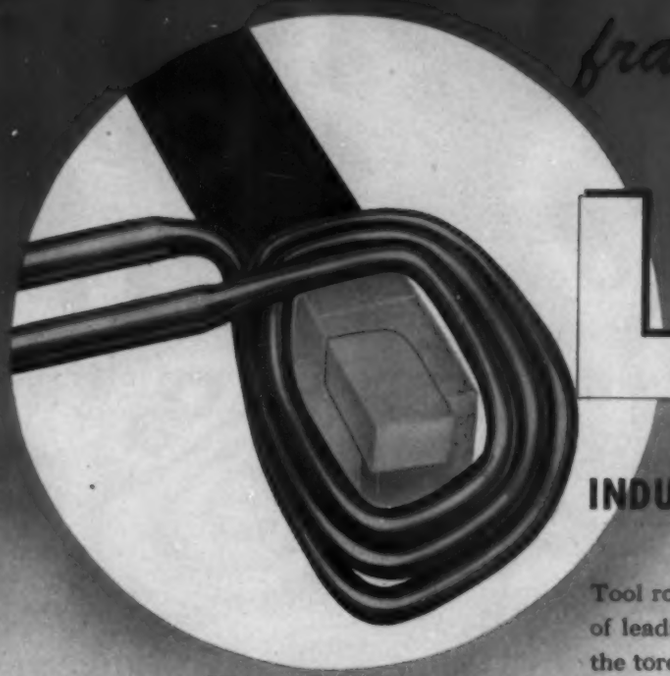
ISAACSON IRON WORKS, SEATTLE

WISCONSIN
ACME GALVANIZING, INC., MILWAUKEE

Not just Galvanizing **but hot-dip GALVANIZING**

BRAZE
TUNGSTEN CARBIDE CUTTING TOOLS
faster, surer, at fractional cost



WITH

Lepel
HIGH FREQUENCY
INDUCTION HEATING EQUIPMENT

Brazing the LEPEL way is simple and sure even for inexperienced operators because the heating cycle is automatically controlled. Heating coils for various tool sizes and shapes are instantly interchangeable.

Tool rooms, everywhere, are following the example of leading cutting tool manufacturers in discarding the torch in favor of high frequency induction heating for brazing tungsten carbide cutting tips. For this simple modern method removes all uncertainty from the brazing operation. With the heating cycle *automatically controlled*, it assures uniform brazing, and uniformly *sure* bond between tip and shank, *every time*. It eliminates losses due to overheating . . . cuts brazing time . . . conserves precious machine hours and critical materials . . . and permits quick removal of worn tips without injury to tip or shank. And it is equally efficient for any type of brazing alloy.

A simple request will bring you complete information on LEPEL High Frequency Induction brazing . . . as well as on the adaptability of compact and economical LEPEL units for *Hardening, Annealing, Soldering* and *Melting*. Write or wire today.

LEPEL High Frequency Induction Units are extremely compact, easily movable on casters, and relatively inexpensive. Operated manually, or, fully automatic. All other operations such as hardening, melting, soldering, etc. are performed by the same unit. Available in models for most industrial applications.

Lepel HIGH FREQUENCY LABORATORIES, INC.

39 West 60th Street, New York, N. Y.

PIONEERS IN INDUCTION HEATING

Here's another 10 seconds the Axis won't get!

You don't stop or slow down the machine to change tools with Apex Quick Change Drill Chucks. And a few seconds saved repeatedly, give you extra *productive* man hours per week per machine.

Green hands catch on quick to these simple, rugged chucks. A flip of the wrist changes drills, taps, reamers, counterbores, etc.—on drill presses, radials, lathes, hand screws, electric and air tools. Plunger design prevents dirt from clogging hole. Ball nose plungers guaranteed not to fall out during life of chuck. Morse taper shanks are standard; others to your specifications. Write for the complete catalog of Apex production tools, No. 14.

APEX

THE APEX MACHINE & TOOL CO., DAYTON, OHIO

Manufacturers of Safety Friction Tapping Chucks, Quick Change and Positive Drive Drill Chucks, Vertical Float Tapping Chucks, Parallel Floating Tool Holders, Power Bits for Phillips, Slotted Head and Clutch Head Screws, Hand Drivers for Phillips and Clutch Head Screws, Aircraft Universal Joints, Plain and Universal Joint Socket Wrenches.

Photo U. S. Army Signal Corps

CAST ARMOR... an important contribution of the Steel Castings Industry to the war effort

THE ARMY'S newest and best tanks are by weight 60% cast steel. Casting the armor for tanks—a new process—substantially reduces the cost compared with former methods.

The properties of Steel Castings that make these better tanks possible, and deliver them in less time, are the same properties that will permit you to build a better, more efficient and more economical product.

For information, consult your own steel foundry, or write to Steel Founders' Society of America, 920 Midland Bldg., Cleveland, Ohio.

MODERNIZE AND IMPROVE YOUR PRODUCT WITH

STEEL CASTINGS

QUALITY

LIKE GOOD BREEDING *is the Hall-mark* OF THOROUGHBREDS

Hansen

INDUSTRIAL AIR LINE EQUIPMENT

For the past quarter of a century Hansen air line equipment has been the outstanding *quality* line, never built down to meet a price but always maintained at a high quality level.

Hansen *quality* means more than just a talking point, it means advanced engineering, hair line accuracy, skilled craftsmanship and the finest materials obtainable. Hansen superiority is brought out and demonstrated in greater performance, speed, ease of operation, extremely low maintenance cost and longer life. Thousands of large and small industrial plants throughout the world are completely Hansen equipped.

Hansen—a name which means the finest in modern air line equipment that more than meets the demands of today's production and tomorrow's competition. *Send for free catalog.*

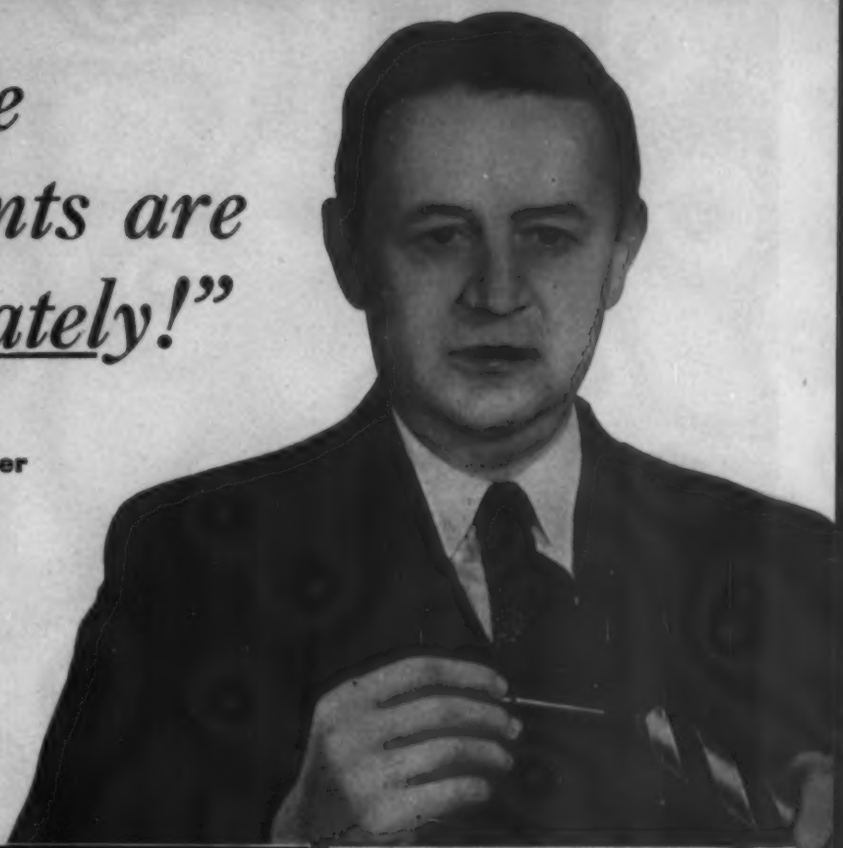
HOSE CLAMPS • AIR HOSE COUPLINGS
HOSE CLAMP SOCKETS • HOSE CLAMP PLUGS
AIR LIQUID SPRAY GUNS • ENGINE CLEANERS
AIR BLOW GUNS • SAND BLAST CLEANERS

Hansen MFG. CO.

INDUSTRIAL *Air Line* EQUIPMENT

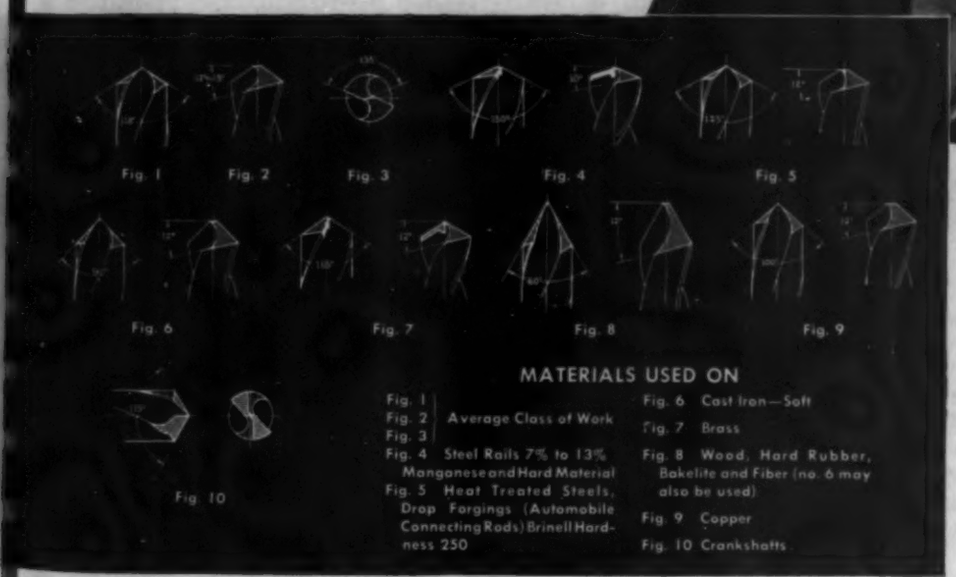
1786 EAST 27TH STREET • • • • CLEVELAND, OHIO

"Be sure twist drill points are ground accurately!"



says A. J. SNYDER, Works Manager
MORSE TWIST DRILL & MACHINE CO.
New Bedford, Mass.

OBTAINING MAXIMUM EFFICIENCY from twist drills is possible only when points are ground correctly. In modern drilling practice, drilling different grades of materials often requires a modification of the commercial 118° drill point. For example, hard materials require a blunter point than do soft materials. (See chart below.)



MATERIALS USED ON

Fig. 1, Fig. 2, Fig. 3 — Average Class of Work
Fig. 4 — Steel Rails 7% to 13% Manganese and Hard Material
Fig. 5 — Heat Treated Steels, Drop Forgings (Automobile Connecting Rods) Brinell Hardness 250
Fig. 6 — Cast Iron—Soft
Fig. 7 — Brass
Fig. 8 — Wood, Hard Rubber, Bakelite and Fiber (no. 6 may also be used)
Fig. 9 — Copper
Fig. 10 — Crankshafts

"FOR A DRILL to perform satisfactorily, the cutting edges should have a proper and uniform angle with the longitudinal axis of the drill. Also, the cutting edges should be of exactly equal length, with the proper lip clearance or contour of the surface back of the cutting edges. This clearance must be the same on each lip. When cutting lips are not uniform, holes will be oversize and the drill will wear on the margin of one cutting lip."

"THE FORM of a drill point exerts a powerful influence upon the rate of production, accuracy of drilled holes and the number of holes which can be drilled between successive grindings. Drill grinding machines, located in tool rooms throughout the plant, are steps toward getting the correct point on drills, as it is difficult to grind a point by hand that will give the desired results without too much loss of time."

The correct cutting oil is as important to proper drilling operations as the correct grinding of the drill points. That's why Shell has developed a control technique that "balances" the oil to the machine, the application and the tool. Call in the Shell man now for details.

SHELL

SHELL LATA OILS
FOR METAL WORKING

WIZARD OF WEIGHING—Dr. Halvor O. Ham, our Chief Consulting Engineer, is dean of the 65-man Toledo Scale research and engineering group. Personally responsible for many far-reaching developments in weighing, testing, force-measuring. Norwegian-born; a forthright U. S. citizen for 40 years; a Toledo man for 28 of them.

RESEARCH IS TIPPING THE SCALES OF WAR AND WILL SET THE STYLE OF A PERMANENT PEACE

Buttressing our far-flung fronts stand the services of Supply. Behind Supply roars Production—*mass-production.* Guiding Production is Engineering, converter of ideas into things—*fighting things.*

Fountain-head of Engineering is Research—"the science of making changes in a scientific way."* Research in its silent scientific way seeks out the solution to the Front Line's constant cry, "Give us more—and better."

To us War Research has meant:
Wind-tunnels that dictate the shapes of super fighters and bombers;
Engine-testers that telegraph the pulse, respiration and metabolic rate of the plane's engines; helping the engineer to better their fighting fitness;
Propeller-balancers that speak for higher speeds and safer handling in the air;
Electronic explosives-batch controls that robot the compounding of ammunition at war-tempo speed and to gnat's-eyebrow accuracy.

These, and dozens of other war-born weighing, testing and force-measuring devices, are war machines in which Toledo Research plays its part.

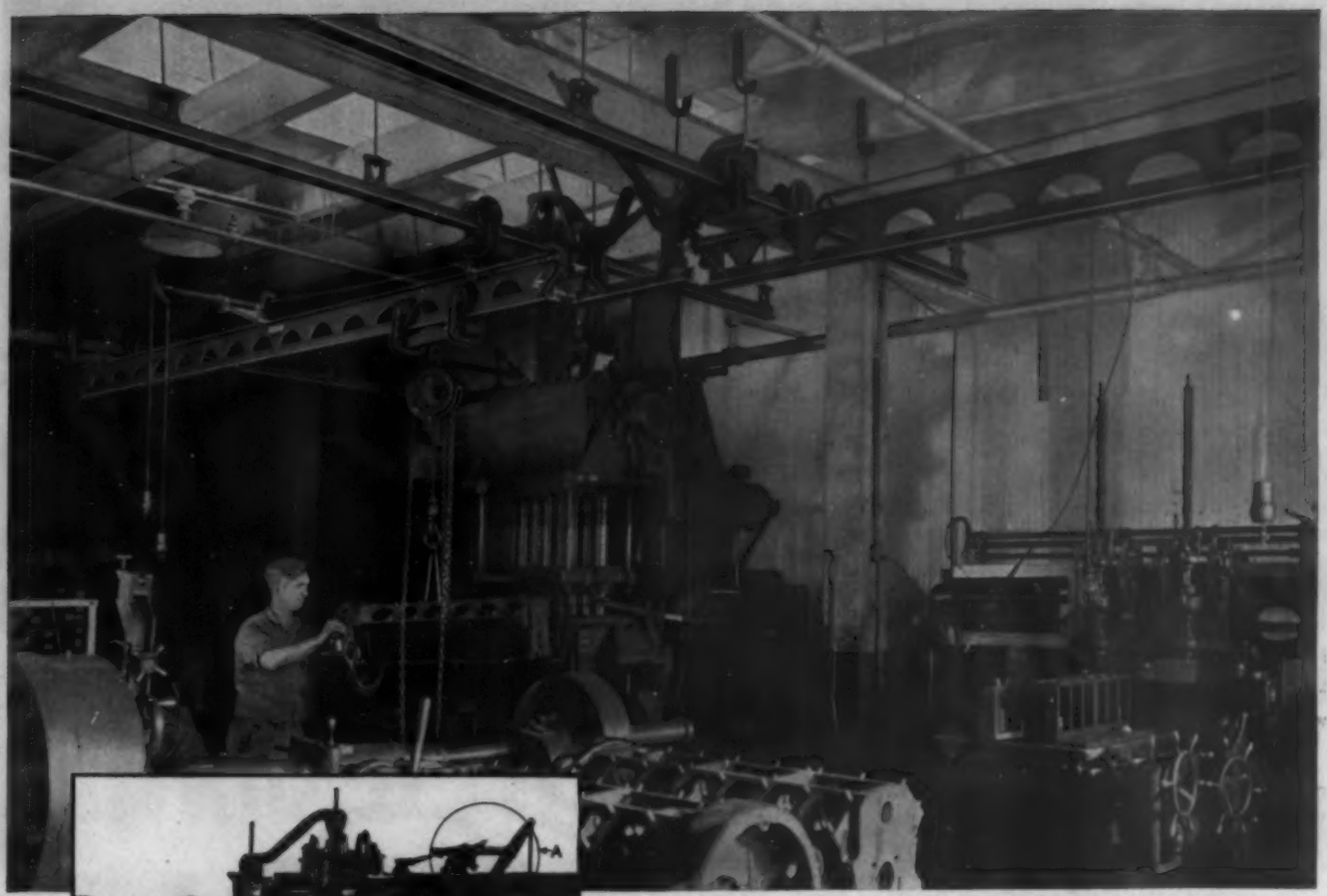
Research the Change-maker is tipping the Scales of War; and will set the style of the Peace to follow. For Research the War-winner will also be the Job-maker in the Peace that must, by right and might, be ours tomorrow.

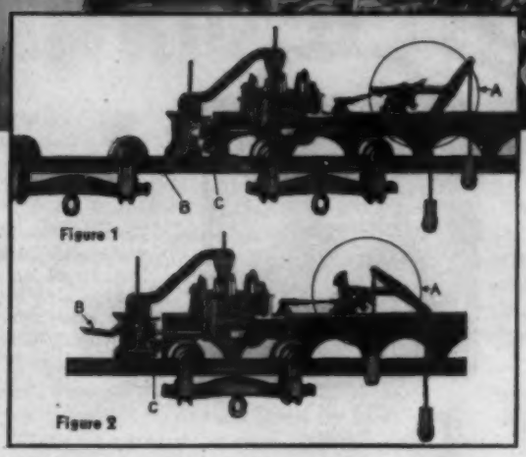
TOLEDO SCALE COMPANY

Toledo, Ohio

Canadian Toledo Scale Co., Limited, Toronto, Ont.

**As defined by that great proponent of Research, C. F. Kettering.*





TRANSFER BRIDGE MECHANISM

Transfer bridges are cranes except one or both ends are provided with an interlock. Carriers cannot be passed through an interlock until the bridge is aligned with another bridge or overhead rail and locked into position by the manually-operated throw-out (A). This causes the safety forks (B and C) to raise automatically and permit free travel. The mechanism prevents all possibility of a carrier running off an open end. Figure 1 shows a bridge in line with a connecting rail, with safety forks down, before throw-out has been operated. Figure 2 shows forks raised, after throw-out has been operated.

TRANSFER BRIDGES SIMPLIFY ENGINE HANDLING

Twelve-cylinder motors for fire engines built by The Seagrave Corporation, Columbus, Ohio, are easily moved from any point in one bay to any point in an adjacent bay in their machine shop, by means of Cleveland Tramrail transfer bridges. Because of a column of posts separating the bays it is impossible to make use of cranes spanning the entire width of the two bays.

The bridges interlock with short stationary rails, permitting the engines to be taken from one to the other without any intermediate handling. The carriers can also be transferred to the overhead Cleveland Tramrail rail system which provides handling coverage for nearly the entire factory. Thus engines can be delivered directly from the transfer bridges to all parts of the large shop.

The transfer bridges shown are of the hand-propelled two-runway type. Other bridges also are built for three, four and more runways either hand-propelled or electrically driven.

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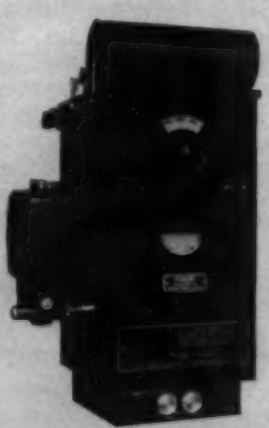

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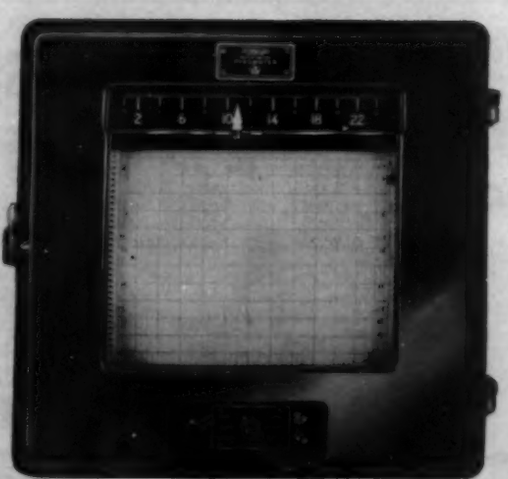

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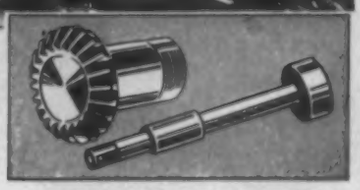

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Servel methods hold scrap from aluminum cylinder head production to minimum. *Page 102*

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STEEL

The Magazine of Metalworking and Metalproducing

APRIL 12, 1943

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FIELD offices are maintained by International Nickel's Development and Research Division and by qualified distributors. Nickel field representatives are always on the go. These men offer practical advice about selection, fabrication and uses of metals. Assistance is likewise offered on problems arising from the diversion of Nickel to war industries.

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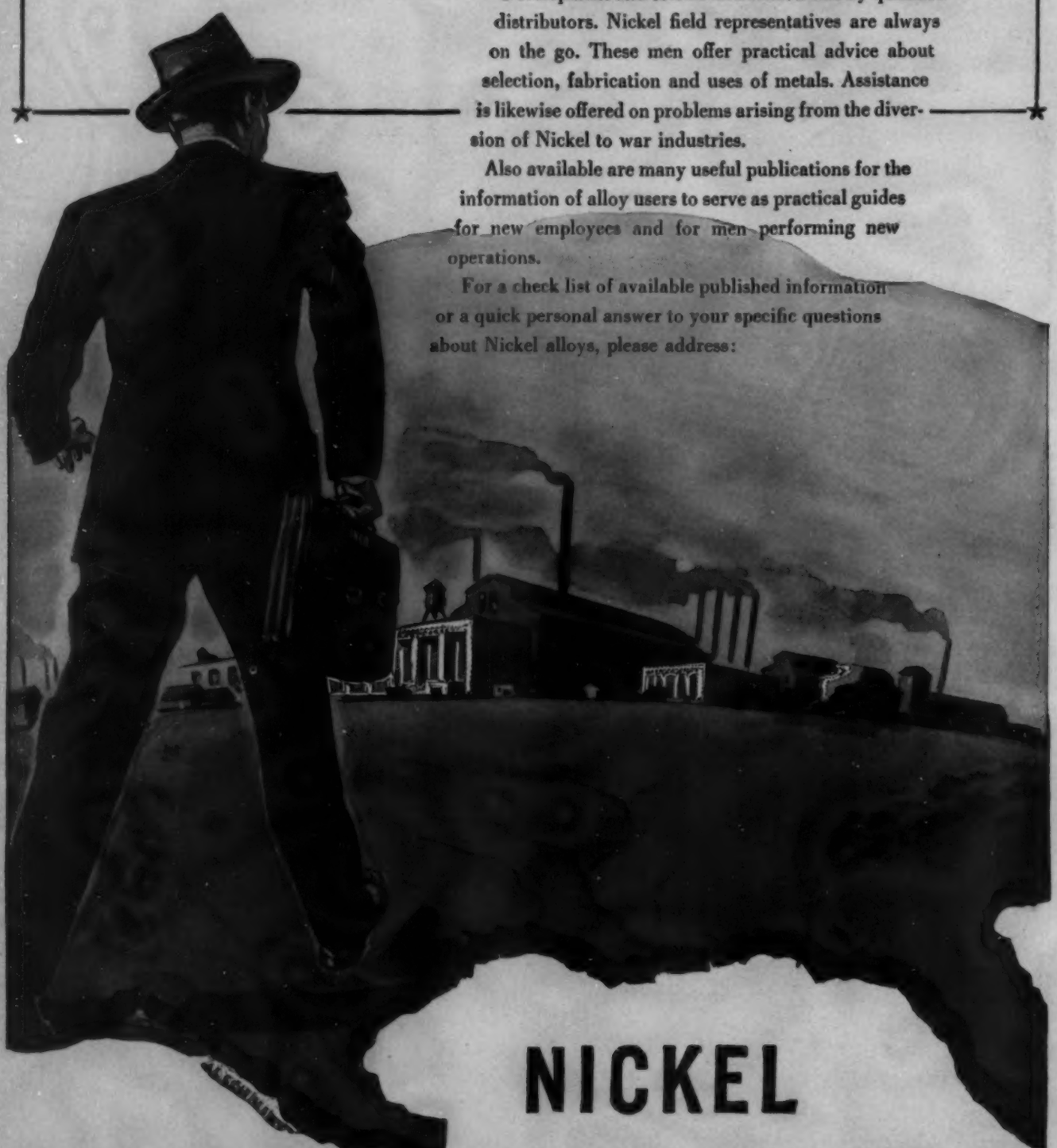

NICKEL

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.

AS THE EDITOR VIEWS THE NEWS

STEEL
April 12, 1943

NEW VANTAGE POINT: For several years STEEL has been strengthening its Washington service to keep pace with the steadily increasing influence of governmental policies and activities upon industrial affairs. Our editorial representation in Washington has been expanded again and again and our editors from the home office have been visiting the nation's capital more frequently than ever before.

Notwithstanding these measures, STEEL now announces a further step in its program of assuring readers the best possible handling of Washington news and developments.

STEEL's editor, E. C. Kreutzberg, has moved to Washington.

From this vantage point, the editor will be better able to penetrate into the sources of pertinent information affecting American business. He will have more direct access to the underlying facts which are so necessary for the proper interpretation of governmental policies and activities.

These direct contacts with important sources will enhance STEEL's service to readers not only for the duration of the war but also through the difficult transitional period and into the exciting and opportunity-laden postwar era.

STEEL is proud to be the first American industrial paper to accord recognition of the tremendous importance of Washington events by asking its editor to take up permanent residence in the nation's capital.

• • •

BOMBS OVER GERMANY: Americans who read of the now frequent day and night bombings of German industrial centers by Allied aircraft sometimes wonder how much these raids have slowed Nazi war production.

An answer is found in the quarterly report of J. A. Horton, STEEL's correspondent in Birmingham, England. According to information reaching Britain (p. 63), bombs have caused a drop in production of 20 per cent in Hamburg and in the Ruhr district and 18 per cent in Cologne. In general, coal output is down 15 per cent, blast furnace operations have been curtailed 15 per cent and steelworks production is off 12½ per cent.

These inroads upon output must present the German government with serious problems. A cut of 15 per cent in our production of pig iron and 12½ per cent in that of steel would play havoc with the American war program. In Germany, where the internal economy is strained far beyond anything we are experiencing, the effect must be extremely demoralizing, if not ultimately disastrous.

• • •

SUPER SALESMAN: In spite of his high position in steel and foreign trade circles, the late James A. Farrell, whose passing was reported in last week's issue of STEEL, never was pompous or "high-hat." Some readers of this page may recall an incident which occurred at a meeting of the American Institute of Steel Construction in Pinehurst, N. C., about 15 years ago, which revealed Mr. Farrell at his best.

During the meeting an argument had arisen over the relations between the two large structural steel fabricators and the scores of small independents. The debate had been heated and some of the participants were disgruntled. The meeting adjourned with the issue still unsettled.

The train from Pinehurst was crowded. Mr. Farrell took pot luck with the other convention visitors and obtained an upper berth. Had he permitted it, his friends could have whispered to the president of the Canadian Pacific Railroad that the president of U. S. Steel was in an upper. That official, whose private car was attached to the train, doubtless would have been delighted to have asked Mr. Farrell to be his guest for the trip to New York.

But Mr. Farrell felt he had a job to do. Until 3 a. m. he sat on a steamer trunk in a smoke-filled washroom parrying one after another arguments of the independent fabricators. When it was over, every man in the room was convinced of Mr. Farrell's sincerity and "sold" on the logic of the position of U. S. Steel in the controversy. It was one of the best jobs of selling this writer has ever witnessed.

Mr. Farrell went far from a modest beginning. Would he have gone any farther if he had lived in

(OVER)

a period when security from "cradle to grave" had been assured by government?

• • •

TOMORROW'S AUTOS: Every reader of STEEL has an important stake in the role of metals in the world of tomorrow. Nobody can even speculate upon this subject—much less plan to cope with its implications—without taking into account the part the great American automotive industry will play after the war ends.

In this connection, some authorities have envisioned a drastic revolution in automotive design. They have predicted a tremendous increase in the use of plastics and light metals at the expense of the more orthodox ferrous and nonferrous materials.

No informed person will dismiss these potential threats lightly. Plastics, aluminum and magnesium are winning new laurels in the fierce competition of war. They will be in line for many new peacetime applications when the fighting is over.

But the postwar rivalry of materials will be decided not so much by the volume of supply as by the ordinary peacetime factors of price and compatibility with the technical requirements of mass production. Like water, competitive materials eventually find their natural level.

This is the underlying theme of a series of four informative articles on the postwar activities of the automotive industry by STEEL's Detroit editor, A. H. Allen, beginning (p. 81) in this issue. This realistic analysis of motordom's postwar policies rates the attention of all past, present and potential suppliers of the automotive industry.

• • •

CLASSROOM WAR WORK: Subcontracting can be highly successful, or it can be a constant headache to all concerned. It is an inescapable fact that there is a wide variation in the efficiency and capabilities of companies available for subcontract work. The trick is to choose the competent ones and to co-ordinate their activities with those of the main contractor.

The ingenuity and resourcefulness required to accomplish this trick are illustrated by the experience of the Summerill Tubing Co., Bridgeport, Pa. Through subcontracting, this company (p. 129) has increased output 500 per cent, put otherwise idle equipment into vital war production work, conserved material, reduced the rate of rejections and instituted a closer tolerance control.

One of the tube mill's subcontractors is Lehigh University. The 900,000-pound compression testing machine in the university's Fritz Laboratory is working on a 24-hour 7-day schedule on tube forming operations. The utilization of this and other laboratory equipment for war purposes is an excellent example of the ingenuity of American industry.

How pleased would be that pioneer steelmaker, John Fritz, if he could see how the laboratory which bears his name is contributing to the war effort!

• • •

FISCAL MISLEADERSHIP: Writing in NEWSWEEK, Ralph Robey observed recently that government agencies headed by men who have been successful in private enterprise are functioning fairly well, whereas those directed by political appointees are bogging down.

This observation seems to have struck a responsive chord in the minds of many editorial writers. Numerous newspapers have commented upon it. They have weighed the records of men like Nelson, Land and Jeffers against those of McNutt, Morgenthau, Brown and others—always to the advantage of the first-named group.

As the editorial opinion of newspapers usually conforms quite closely to majority public opinion, this demonstration may be construed as an indication that the man-in-the-street is becoming aware of the shortcomings of governmental agencies directed by politically-minded men. It is not difficult to believe that the average citizen is on the point of becoming fed-up with attempts to run the war on a political basis.

The recent tax muddle is a case in point. The treasury officials have exercised such inept leadership in tax matters that the pay-as-you-go aspect has become a political football. Worse yet, in their inability to assert constructive fiscal leadership, the administration's treasury officials and congressional whips are obstinately obstructing progress in drafting a tax program.

Taxpayers were patient with the lamentable delay and inexcusable hocus pocus in tax legislation in 1942. They will not be as patient if the recent disgraceful stalemate drags on into mid-1943, or later. The administration must work fast if it is to prevent its fiscal policies from being thoroughly discredited.

E. L. Shaner

EDITOR-IN-CHIEF

THEY'RE Faster
AND GO FARTHER
American planes today have what it takes! Speed — wider cruising range — greater firepower — maneuverability! All this — due to the ingenuity of aviation engineers and machine tool builders — working with the right kind of tools. That's where Wesson Carbide Cutting Tools are doing their part — cutting tougher metals, faster, with greater precision, with minimum rejects. » » » Pioneers in "tooling up" for aviation motor production, Wesson Company is constantly setting new standards of precision and speed in Carbide Cutting Tools.
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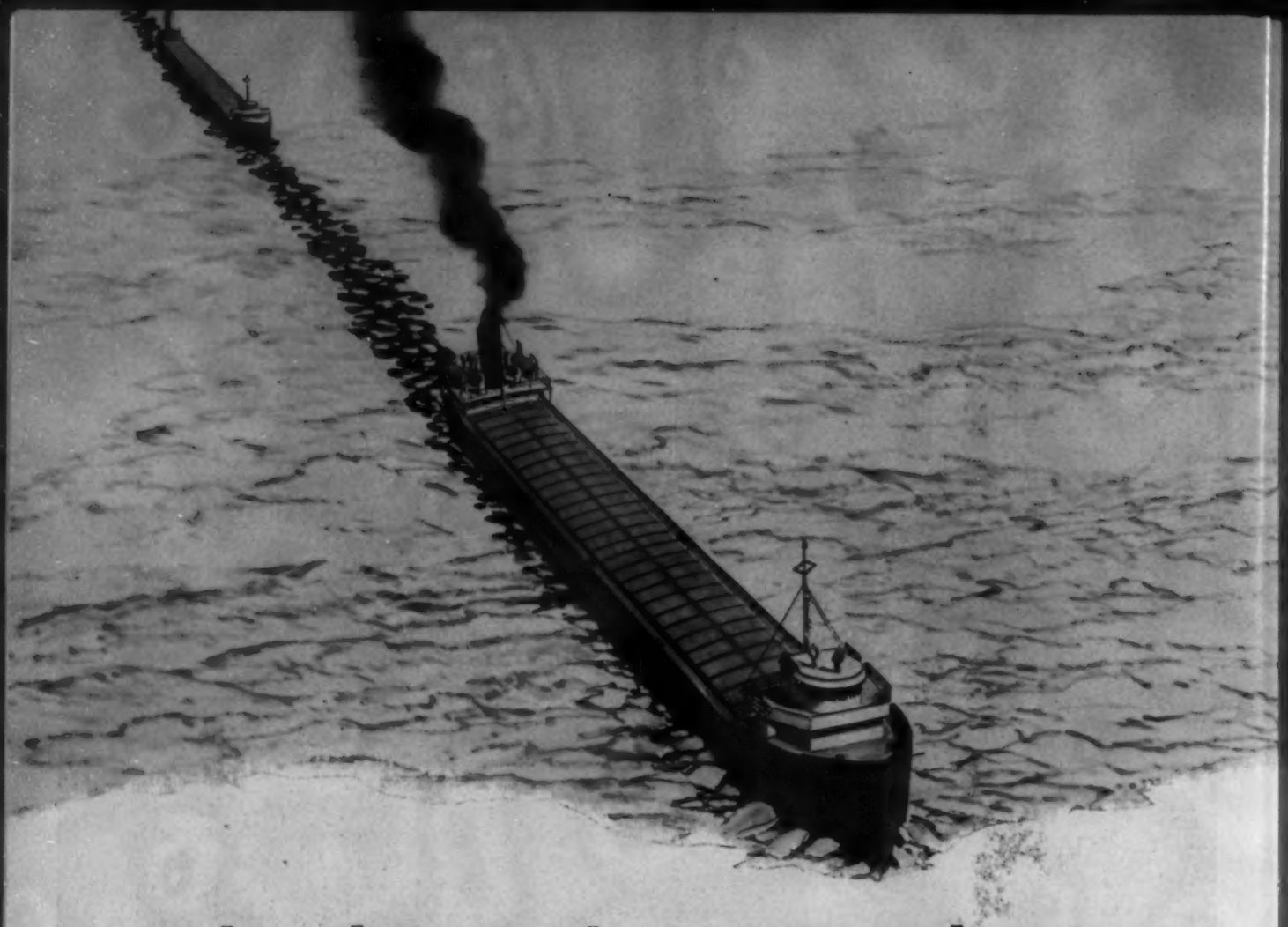

Inland Freighters Battle Ice

Again Must Move Record Tonnages of Iron Ore

Since mid-March crews have been aboard ore carriers of the Inland Fleet—preparing for another long season and record tonnages of iron ore from the Upper Great Lakes Region.

Cargo holds have been cleaned, every piece of machinery overhauled, boilers repaired, pumps repacked, and the ships painted—everything made ready for the first trips into ice-filled lake waters.

Usually the season of navigation opens early in April and closes in late November. Last year the first Inland ships left Indiana Harbor March 25 and the last cargo of ore arrived on Dec. 13. The Fleet made an all-time tonnage record, and the *L. E. Block*, Inland flagship, established a new mileage record for such vessels by traveling 61,887 miles in 38 trips.

Iron ore shipments on the Great Lakes last year were twelve million tons higher than in 1941, and the tentative quota for this year is boosted to three million tons more than last. But if readiness of equipment and men is any indication, the Inland Fleet can be depended upon to carry its share of this huge tonnage in the busy season ahead.

Seamen on the Inland ships, like the Inland steelmakers, are fully aware of their important part in producing the "fighting steel" needed for Victory.

ARMY E NAVY

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German Steel Production Cut By Bombings, Absenteeism

French industry busy building Nazi armaments, but is handicapped by scarcity of raw materials. . . Britain follows American pattern in pruning back undelivered allocations

By J. A. HORTON

British Correspondent, STEEL

BIRMINGHAM, ENG.

HAVING seized the initiative the United Nations are forging ahead with preparations for the promised assault on the enemy in occupied Europe this year. Industrial centers in the Ruhr are being pounded consistently night after night by Allied bombers, and while German authorities are loudly proclaiming increases in the Reich's steel production there is little doubt that this is far from the truth.

As far as can be gathered from reports reaching Britain, there is a definite drop in output as much as 20 per cent in Hamburg and the Ruhr district; in general, coal production is down 15 per cent, iron 15 per cent and steel 12½ per cent. At Cologne production has dropped 18 per cent.

There is also absenteeism, particularly among imported foreign workers, much of the absenteeism being due to malnutrition.

Changes in organization in Germany itself indicate all is not well with the steel industry. The Rohstahlgemeinschaft which has existed for many years and was a volutary association comprising various leading sales syndicates in the German steel industry has been dissolved, and has been replaced by an organization known as Eisen and Stahlwerks-Gemeinshaft in der Reichvereinigung Eisen, or ESGE, to which affiliation is compulsory.

Distribution Being Tightened

Most of the sales syndicates will remain in being although some of them are to be wound up and others amalgamated. Object is to tighten the distribution side of the industry; the allocation of orders to works for semifinished and finished steel will no longer be dictated by any financial considerations, the dominant factor being the fullest possible utilization of available capacity.

Here is fairly clear evidence that the destruction of steelworks and rolling mills has brought about, in part, this policy. It is understood that the new ESGE and RVE will foster the use of basic bessemer, or Thomas, steel instead of Siemens-Martin. Special price equalization arrangements will free ESGE and its sub-sales syndicates from placing business except where the highest output can be achieved. ESGE will play a big part in adjusting distribution and production. It will also settle all questions relating to prices, regulation of imports and exports and many other matters.

The prominent steel magnate, Roechling, writing recently in the magazine *Vierjajresplan* said war demand for special steels had grown so enormously that it has been necessary to manufacture them by processes previously re-

—o—

Crane unloads two 1000-pound aerial bombs from an American ship at Liverpool, Eng. They will be transferred to an American heavy bomber base "Somewhere in England" and from there to industrial targets in occupied Europe. NEA photo

British aircraft factories have been established underground in abandoned quarries and are considered immune from bombings. Shown above is a section in a subterranean workshop. Note the excellent lighting arrangements and the ventilation shafts running along the ceiling. The tea wagon, left, is kept close to refresh the women workers. NEA photo, passed by censors

garded as only suitable for lower-grade qualities. For the mass production of special steel, he claimed that the Thomas converter could be satisfactorily employed.

In the case of mild steels it was admittedly difficult to obtain the same cold treatment of properties as with Siemens-Martin steel, but even this problem had been solved. The possibilities of increasing steel production, using the available plant, therefore, has been increased enormously. Conquest of Lorraine, Luxembourg, Belgium, France, the Bohemia-Moravia Protectorate and Poland besides the other territories in German hands made it possible to produce iron and steel on a huge scale if a sensible economic policy were adopted.

Capture Russia's Steel Industry

In addition there was the captured Russian steel industry which, where in so far as it had been destroyed, was being rebuilt. Finally the reserves of iron and manganese ores which had fallen into German hands in Russia alleviated the problem of Germany's raw materials supplies considerably. Roechling claimed that Germany now not only possesses sufficient steelmaking capacity to conduct the war but also to safeguard the whole of European economy.

A recent report of the Inter-Allied Information Committee mentions the abundant evidence of the drastic and widespread interference by the German invaders with the industries of Belgium. German firms have established themselves there since the war on the Western front of Europe began, and many others have acquired a controlling interest in existing Belgian undertakings.

German companies invest a great deal of money in Belgian concerns and are enabled to insinuate their own representatives into the management. Among the industries thus encroached upon by Germany are the electrical, chemical, coal, steel, agricultural and mining machinery industries. The main purpose of this policy is to extend German economic control until Belgium is completely absorbed into the German system. Numerous methods are adopted, some obvious, some less so, but all designed to bring industry under the German thumb, and if any undertaking collapses under the strain, it is helped if the Germans think fit, with money contributed by other Belgian concerns. As an example of this encroachment comes news from Belgium that a subsidiary company of Krupps, the German armament concern, has been established in Brussels with a capital of 125 million francs. The board of the new undertaking is responsible to the parent company at Essen.

In France, the iron and steel industry, engaged exclusively on German account, is busy and employment is higher than in pre-war years. Some difficulty appears to have been encountered in maintaining adequate supplies of raw materials to the works. The coal situation gave rise to some concern, but by restricting non-essential consumers greater tonnages have been diverted to the iron and steelworks. Under German orders, works have undergone various fundamental changes to improve the volume of finished products supplied to the Reichswehr and ancillary German industries. Many plant extensions are reported as well as extensive rationalization of operations.

These measures have been made possible by the "close collaboration" between German and French armament industries. Concentration has also formed a part of this adaption of industry to German needs, and has led, it is claimed, to a marked increase in output.

Some idea of the prices prevailing in Europe today is very difficult to give but the *Metal Bulletin*, London, has drawn up a list in response to a request from a reader. Foundry No. 3 pig iron in Belgium costs 1000 francs per metric ton, and in Italy 950 to 960 lire. Belgian billets are marked at 1230 francs and Italian at 1590 lire.

According to a writer in a German journal, Italy is aiming at an ultimate output of 8,000,000 to 9,000,000 tons of steel per annum to carry out her responsibilities in the postwar years. It is stated that since 1935 her industrial output has increased by 40 to 50 per cent. The period 1929 to 1938 has seen coal output stepped up nearly 250 per cent, while iron and steel industry has been steadily expanded. In 1938, steel output was 2,300,000 tons.

"Pruning" Undelivered Allocations

A system of "pruning" undelivered allocations has just been announced by the British Ministry of Supply. It follows American proposals on similar lines. In future no orders for the materials set out below may be accepted by makers during the last month of any period for delivery in that period without prior approval of the iron and steel control. This will be given only in exceptional circumstances and normally only after consultation with the government department concerned: Heavy rolled steel, shell steel, re-rolled steel, bright steel bars, cold-rolled strip, sheets, tubes, forgings, drop forgings, steel castings, iron castings and alloy steel. An exception may be made for under one ton where the material is required for urgent repair work. Any permission previously given for orders to be carried forward by more than one period beyond that for which they were authorized is withdrawn except in the case of bolts, nuts, rivets, washers and screws.

In the case of all undelivered bal-

ances of orders amounting to 10 tons or over in the case of carbon steels, and 5 tons in the case of alloy steels which may still be undelivered at the end of the second quarter, the supplier must advise the contractor of the position at least a month before the end of that quarter. The customer will then request the department to extend the authorization if the order is required.

North African Ore

The promise of iron ore from North Africa has aroused considerable interest and anticipation in the British smelting industry, but it is believed that it may be some time before arrivals can be expected, particularly as North Africa is still the scene of hard fighting. Meanwhile works are being kept supplied with British iron ore, limestone, coal and coke in adequate quantities and output is almost entirely for war purposes.

A restricted export business is being done, although material urgently needed for merchant shipbuilding, warcraft construction, dock installations, essential mining, etc., in the Colonies and back areas of the fighting fronts is shipped.

The new order by the Iron and Steel Control described above has had the immediate effect of slowing down business, a process to be expected each quarter. Hitherto there has been great congestion of orders which forced producers to turn down business for delivery during the current period. There is nothing to prevent consumers placing their contracts for April, May and June, and this they are already doing.

During the past few weeks it has been noticeable that re-rollers have found it necessary to draw on their reserves of semifinished steel in order to keep up with their demands for finished material, particularly light structural steel, of which a big tonnage is being used for war purposes. In some instances these stocks were fairly extensive but of course they will have to be built up again as a matter of policy. Much has been done to increase output but there is still a gap between supply and demand.

The tin plate industry is still working below capacity and some works have closed. Hopes are that the position may improve as the canning season approaches, but there is no doubt that the loss of British sources of tin supplies in the East have affected the trade seriously, and the loss of markets abroad indicates another postwar problem.

Rumor Thyssen Will Be Axis Peace Envoy

Swedish sources last week reported Fritz Thyssen, former German steel magnate who helped finance Adolph Hitler's rise to power and who later repudiated the Nazi leader, is "in custody" in Berlin and will be sent to carry a peace proposal to neutral and allied industrial leaders.

Thyssen, who fled Germany after the war started, cabled to STEEL in November, 1939: "It was my duty in the interest of my country to oppose the present leader. Therefore, I had to leave my country. I cannot tell more now, but perhaps later."

Thyssen in recent years has been variously reported to have died, to have fled to South America, to have been interned in the German Dachau concentration camp, or to have met sundry other fates.

The Swedish sources, quoting "trustworthy" German spokesmen, said the Nazis were preparing to use Thyssen as contact man with foreign businessmen to pave the way for an understanding based on the Nazi presumption that "England and the United States do not want a Russian hegemony in Europe."

BRITISH MISSION COMPLETES STUDY OF NATION'S STEEL PLANTS

METALLURGICAL mission of the British Iron and Steel Control, which has been visiting steel plants in this country, has completed its survey and submitted its report. As result of the mission's study, it is expected that steelmaking and consuming practices of the United States, Canada and Great Britain will be further harmonized. Members of the group, seated, left to right: H. H. Burton, chief metallurgist, English Steel Corp.; Dr. W. H. Hatfield, of Thomas Firth & John Brown; C. R. Wheeler, joint deputy controller of iron and steel, Ministry of Supply; Dr. T. Swinden, of Samuel Fox and director of research for United Steel Co. Ltd.; Maj. E. W. Senior, director, iron and steel division, British Raw Materials Mission. Standing: D. A. Oliver, of William Jessops; William Barr, of Colville's Ltd.; D. L. Burn, deputy director of statistics, British Iron and Steel Control; F. H. Saniter, iron and steel division, British Raw Materials

Shortage of Workers Threatens 1943 Ship Construction Goal

HIGH rates of labor turnover are causing a serious manpower situation in the shipbuilding program, the Maritime Commission reported last week. The commission noted a "deficit" of 70,000 workers in the industry during the first quarter of 1943.

The turnover rate on a national basis amounts to 11.2 per cent a month of the total working force.

During the first quarter this year, Maritime Commission contract shipbuilding yards required more than 200,000 workers to replace those who were separated from their payrolls. Replacement needs were greater on the Pacific coast, the total there being 122,378, according to the commission.

Replacement needs in other areas were: Atlantic seaboard, 41,337; Gulf coast, 36,568; Great Lakes, 1715. This replacement total swelled the estimated intake requirements of the shipyards to 333,695 for the first quarter of this year. Actually 262,617 workers were hired leaving a deficit of 71,078 workers from the total desired by the shipbuilders. The deficit was 60,854 on the Pacific coast.

In many shipbuilding communities, serious housing shortages have made it impossible for these areas to provide homes for as many workers as the yards could use, the War Manpower Commission reported.

To reach the increased tonnage construction goal of 1943, it was estimated that 132,799 additional workers would be required in the Maritime Commission contract yards during the first quarter. This estimate provided for expansion of personnel only and did not include the needs for replacement of those separated from payrolls. The total of the two—replacements and expansion—brought the intake requirements up to 333,695. The total intake actually was about 263,000.

Rear Admiral Howard L. Vickery, vice chairman of the commission, in charge of the shipbuilding program, commented on the development as follows:

"The situation is so critical as to indicate that it is imperative to reverse the current manpower trend if we are to insure the completion of the scheduled program on time. We are asking (and receiving) hearty co-operation from other government agencies, including the Manpower Commission and its United States Employment Service, as well as shipyard managements and organized labor in the effort to solve the manpower problem in ship construction. Unless the situation changes, the ships to be most seriously affected will be tankers, aircraft carriers, troop transports, and escort vessels because the greatest shortages appear in yards on such construction."

Time Clock Dispute Causes Shutdown at Edgar Thomson

Loss of 2200 tons of steel ingots and 2000 tons of pig iron resulted from a work stoppage at the Edgar Thomson plant of Carnegie-Illinois Steel Corp., Pittsburgh, last week. The strike developed from a dispute over installation of time clocks which necessitated the shifting of 16 time takers to new jobs at a lower rate of pay. All but 200 of the plant's labor force stopped work on the morning turn April 7.

The night turn reported for work after an agreement was reached that the union's grievance committee and management study the fairness of the change.

A statement by the company said: "In a program which had its inception with certain of the company's plants more than two years ago the conventional time clocks when in need of replacement were eliminated in favor of a new time recorder by which the men record their entrances to the plant by use of a charge-a-plate identification which they carry with them.

"The use of the new equipment eliminated the former occupation of time taker and the employes normally engaged in this work were offered employment elsewhere in the plant and the majority of the 16 workers involved readily accepted. The balance objected to taking any other work in the plant at less than the rate of their former occupation. The company in its proposal to change the time recording setup discussed the matter with the grievance committee and no exception was taken other than a protest concerning the rate of pay which those affected would receive on other jobs."

The management stressed that a grievance could be processed on this matter through the machinery provided for in the contract now in effect.

More than 15,000 tons of coal, urgently needed by the steel plants of Republic Steel Corp., have been lost due to a strike at the company's Crescent strip mine near Charleroi, Pa.

Strike is due to a wage demand which officials of the United Mine Workers of America have presented and which the company is willing to meet, provided the

STUNTS EMPHASIZE PRODUCTION LOST BY ABSENTEEISM

TO COMBAT absenteeism, employes of Dravo Corp., Neville Island, Pittsburgh, recently staged some "high jinks" to shame lay-offs. Stunts included the launching of the ship ABSENTEE and the attempted award of the Axis "E" to employes whose absences caused the loss of 100,000 man-hours in 23 days. Photo shows Axis leader imitators, unable to find a worker willing to accept the swastika award, hoisting the flag themselves. Workers in the background immediately tore down and ripped the flag asunder

VAN A. BITTNER

Vice president of the United Steelworkers of America, has been mentioned as logical successor to Thomas J. Kennedy on the War Labor Board. Kennedy, secretary-treasurer of the United Mine Workers, whose demand for a $2-a-day raise probably will come before the WLB soon, has resigned

increases asked are approved by the National War Labor Board.

Union officials refuse to join in the application for the increase to the board as is required.

Union officials also first demanded that any wage increase be retroactive to the date of Republic's acquisition of the mine, Dec. 11, 1942, and now demand that any increase be made retroactive throughout the operation by the contractor who preceded Republic in working the property.

Production of naval vessels and ore carriers at the Cleveland plant of the American Shipbuilding Co., Cleveland, was halted when nearly 1200 workers struck for reasons which remained obscure at week's end. Apparently the stoppage was caused by a jurisdictional dispute.

UMW Buy Newspaper Space To Plead for Wage Increase

In an attempt to turn the mounting tide of antagonism to their demands for a $2-a-day wage increase and other concessions, the United Mine Workers of America last week launched an advertising campaign in leading newspapers purportedly telling the "American Coal Miner's Story."

Raising the question, "Are the United Mine Workers holding a gun at the nation's heart?" the advertisements ask the public to "be fair."

Cited in support of the miners' demand for the wage increase are increases in the cost of food and other arguments which the UMW have been advancing during negotiations with the coal mine operators.

48-Hour Week Would Cost Steel Industry $100,000,000 Annually

EXTENSION of a mandatory 48-hour work-week to all plants of the steel industry would increase total steel payrolls by $100,000,000 a year, the American Iron and Steel Institute estimates. (STEEL's estimate of the increased cost was $100,000,000 to $120,000,000. STEEL, March 29, p. 34).

The increase would come from the payment of time-and-a-half for more than 40 hours of work per week.

Such an increase, if made, would be the third to go into effect since 1941, and would result in an aggregate increase in steel payrolls of approximately $300,000,000 annually through pay raises in the past two years. During that period there has been no increase in the composite price of steel products.

In March, 1941, steel wage rates were raised 10 cents per hour, which lifted the average hourly earnings of wage earners to a new peak of 99 cents per hour. That increase added $120,000,000 a year to the industry's payrolls.

Late in 1942 the so-called "Little Steel" wage formula promulgated by the War Labor Board raised average hourly wages throughout the industry to about $1.10 per hour. The effect of that raise was to increase the industry's payrolls by another $75,000,000 a year.

The mandatory 48-hour work-week already has been imposed in Detroit, Buffalo and Baltimore, and soon will be established in the Chicago suburban area and the Cleveland district.

In January, 1943, the average work-week for all steel employes was just under 40 hours per week. Tonnage of steel produced that month represented virtually the full capacity of the industry.

Extending the work-week to a mandatory 48 hours would mean 8 hours of work per week at time-and-a-half wage rates for an estimated 500,000 employes. At the present base scale of wages this would represent $2,000,000 in overtime payments per week.

Patrick T. Fagan, veteran labor leader, was nominated last week by President Roosevelt to be the Pittsburgh area director of the War Manpower Commission. Mr. Fagan had been president of District No. 5 of the United Mine Workers of America but was deposed in a recent election by John L. Lewis because Fagan had sided with Philip Murray in the feud between Murray and Lewis.

"VITAMIN VANS" BRING LUNCH TO WORKERS

STAINLESS steel rolling cafeterias are pulled down one of the half-mile long aisles of the Boeing Aircraft Co.'s plant in Kansas. Each mobile section is filled with enough food to feed 250 workers. NEA photo

Industry at 100 Per Cent in March, Makes 7,670,187 Tons of Ingots

ALL monthly records for total steel production were broken in March according to the American Iron and Steel Institute, when the industry operated at full 100 per cent to produce 7,670,187 net tons.

That total exceeded by nearly 90,000 tons the previous high of 7,579,514 in October, 1942, when the industry likewise operated at its rated capacity. Details for March and the first quarter follow:

Open-hearth, 6,785,295 and 19,395,558 tons, respectively; 100.9 and 99.3 per cent.

Bessemer 503,673 and 1,429,574 tons; 90.5 and 88.4 per cent.

Electric 381,219 and 1,095,146 tons; 98.5 and 97.5 per cent; total 7,670,187 and 21,920,278 tons; 100 and 98.4 per cent.

Monthly Peaks Set by Several Producers

All-time records in steel ingots and pig iron were achieved in March.

Monthly production of ingots at the Indiana Harbor, Ind., plant of Inland Steel Co. was 7749 net tons greater than in any prior month. Fourteen plant production and shipment records also were set in March. During 1942 a total of 51 production marks were made by this plant, despite loss of hundreds of workers to the armed services and lack of scrap during part of the year.

Bethlehem Steel Co. made 1,113,500 tons of ingots, largest output for any month in the company's history. This was 16,000 tons greater than the total in October, 1942, the prior high mark. Steelmaking plants operated at 101.1 per cent of capacity. Eugene G. Grace, president, pointed out that about one-third of the tonnage was of alloy and other high quality grades of steel, requiring more time in processing than ordinary steel.

Blast furnace department of Colorado Fuel & Iron Corp., Pueblo, Colo., reached its highest tonnage in March with 66,085 net tons of pig iron, exceeding its prior high of 60,662 tons last December.

Forecasts Output of 92,000,000 Tons in 1943

Steel output in 1943 is expected to reach an all-time record of 92,000,000 tons of ingots and castings, a gain of 6,000,000 tons or 7 per cent over 1942, according to an estimate last week by the Bureau of Foreign and Domestic Commerce, Department of Commerce.

Original expansion program for the industry called for completion of facilities to bring total steel capacity to 97,100,000 tons by the middle of 1943. Expectation now is that new facilities by that time will bring annual capacity to 95,000,000 tons and estimate of total output of 92,000,000 tons is based on that figure.

A critical factor is ability of the industry to produce sufficient pig iron. Furnace capacity at the beginning of the year was 61,000,000 tons. Completion of the present expansion program on schedule would increase this to an estimated 68,600,000 tons. Unless this expanded capacity is completed early this year and unless existing furnaces can maintain or improve their already high rate, pig iron output easily could fall short of the 1943 goal.

Part of all such deficiency in pig iron probably could be made good by increased consumption of scrap. Stocks of scrap now are about 7,000,000 tons, 50 per cent larger than last year. Home scrap, originating in steel mills, will be in larger supply because of greater steel output. If it is possible to collect purchased scrap in volume equal to that of 1942 the industry will have a substantial safety factor to offset any probable pig iron deficiency.

An uncertain element is possibility of a coal strike. It is estimated the iron and steel industry will use roughly one-sixth of the bituminous coal produced this year. A prolonged strike would be a serious threat to the iron and steel industry and the entire war program.

A further factor is capacity of the industry to roll ingots into desired finished products. Finishing capacity in most plants is about 30 per cent in excess of ingot capacity, permitting flexibility over a wide range of products.

The bureau concludes that no matter how large steel output is in 1943, with war needs increasing, war and essential civilian requirements will surpass it.

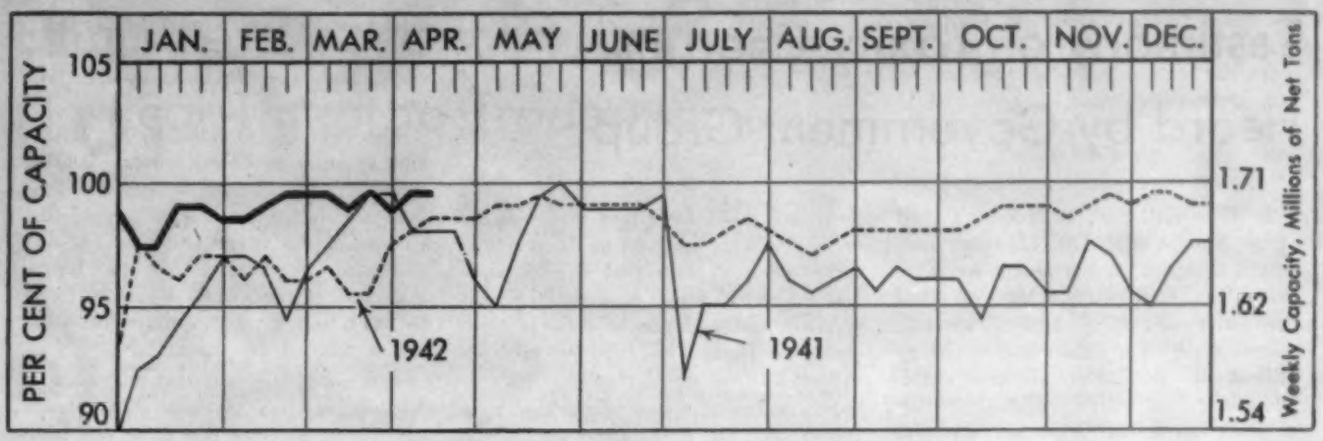
STEEL INGOT STATISTICS

Estimated Production—All Companies

	—Open Hearth— Net tons	Per cent of capacity	—Bessemer— Net tons	Per cent of capacity	—Electric— Net tons	Per cent of capacity	—Total— Net tons	Per cent of capacity	Calculated weekly production, all companies Net tons	Number of weeks in month
Based on Reports by Companies which in 1941 made 98.5% of the Open Hearth, 100% of the Bessemer and 87.8% of the Electric Ingot and Steel for Castings Production										
1943										
Jan. . .	6,563,317	97.5	478,058	85.9	367,369	94.9	7,408,744	96.6	1,672,403	4.43
Feb. .	6,020,006	99.1	447,843	89.1	344,031	98.5	6,811,882	96.5	1,702,970	4.00
Mar .	6,785,295	100.9	503,673	90.5	381,219	98.5	7,670,187	100.0	1,731,419	4.43
1st qtr.	19,395,558	99.3	1,429,574	88.4	1,095,146	97.5	21,920,278	98.4	1,704,532	12.86
Based on Reports by Companies which in 1941 made 98.5% of the Open Hearth, 100% of the Bessemer and 87.8% of the Electric Ingot and Steel for Castings Production										
1942										
Jan. . .	6,328,128	95.4	490,864	86.0	305,930	96.3	7,124,922	94.7	1,608,335	4.43
Feb. .	5,791,813	96.7	453,543	88.0	275,700	96.2	6,521,056	96.0	1,630,264	4.00
Mar. .	6,574,701	99.1	493,294	86.4	324,916	102.3	7,392,911	98.2	1,668,829	4.43
1st quar	18,694,642	97.0	1,437,701	86.7	906,546	98.3	21,038,889	96.3	1,635,994	12.86
April .	6,346,707	98.8	454,583	82.2	321,023	104.4	7,122,313	97.7	1,660,213	4.29
May .	6,600,376	99.5	454,054	79.5	332,460	104.7	7,386,890	98.2	1,667,470	4.43
June .	6,247,302	97.2	452,518	81.8	322,335	104.8	7,022,155	96.4	1,636,866	4.29
2nd qtr	19,194,385	98.5	1,361,155	81.2	975,818	104.6	21,531,358	97.4	1,654,985	13.01
1st half	37,889,027	97.8	2,798,856	83.9	1,882,364	101.5	42,570,247	96.9	1,645,545	25.87
July . .	6,350,047	93.7	453,684	79.6	345,093	96.3	7,148,824	94.5	1,617,381	4.42
Aug. .	6,420,496	96.6	467,313	81.8	345,642	96.8	7,233,451	95.4	1,632,833	4.45
Sept. .	6,297,201	98.0	437,950	79.4	331,963	95.7	7,067,084	96.5	1,651,188	4.28
3rd qtr.	19,067,744	96.8	1,358,947	80.3	1,022,688	96.1	21,449,359	95.5	1,633,615	13.13
9 mos.	56,956,771	97.4	4,157,803	82.7	2,905,032	99.5	64,019,606	96.4	1,641,528	39.00
Oct. . .	6,757,696	101.6	461,895	80.9	365,273	101.7	7,584,864	100.1	1,712,159	4.43
Nov. . .	6,378,661	99.1	458,426	82.9	347,473	99.9	7,184,560	97.9	1,674,723	4.29
Dec. . .	6,471,465	97.6	475,124	83.4	356,590	99.5	7,303,179	96.6	1,652,303	4.42
4th qtr	19,607,822	99.4	1,395,455	82.4	1,069,336	100.4	22,072,603	98.2	1,679,802	13.14
2nd hlf	38,675,566	98.1	2,754,392	81.3	2,092,004	98.3	43,521,962	96.8	1,656,717	26.27
Total. .	76,564,593	97.9	5,553,248	82.6	3,974,368	99.8	86,092,209	96.9	1,651,174	52.14

The percentages of capacity operated in the first six months of 1942 are calculated on weekly capacities of 1,498,029 net tons open hearth, 128,911 net tons bessemer and 71,682 net tons electric ingots and steel for castings, total 1,698,622 net tons; based on annual capacities as of Jan. 1, 1942 as follows: Open hearth 78,107,260 net tons, bessemer 6,721,400 net tons, electric 3,737,510 net tons. Beginning July 1, 1942, the percentages of capacity operated are calculated on weekly capacities of 1,500,714 net tons open hearth, 128,911 net tons bessemer and 81,049 net tons electric ingots and steel for castings, total 1,710,674 net tons; based on annual capacities as follows: Open hearth 78,247,230 net tons, bessemer 6,721,400 net tons, electric 4,225,890 net tons.

Percentages of capacity for 1943 are calculated on weekly capacities of 1,518,621 net tons open-hearth, 125,681 tons bessemer and 87,360 tons electric ingots and steel for castings, total 1,731,662 net tons; based on annual capacities as of Jan. 1, 1943, as follows: Open-hearth 79,180,880 net tons, bessemer 6,553,000 net tons, electric 4,554,980 net tons.



STEEL INGOT PRODUCTION BY MONTHS

Net Tons, 000 omitted

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1943	7,408	6,811	7,670									
1942	7,124	6,521	7,392	7,122	7,386	7,022	7,148	7,233	7,067	7,584	7,184	7,303
1941	6,922	6,230	7,124	6,754	7,044	6,792	6,812	6,997	6,811	7,236	6,960	7,150

PIG IRON PRODUCTION

1943	5,194	4,706	....	....	....	....	....	....	....	....	....	....
1942	4,983	4,500	5,055	4,896	5,073	4,935	5,051	5,009	4,937	5,236	5,063	5,201
1941	4,666	4,206	4,702	4,340	4,596	4,551	4,766	4,784	4,721	4,860	4,707	5,014

Ingot Rate Steady At 99½ Per Cent

Production of open-hearth, bessemer and electric furnace ingots last week was unchanged at 99½ per cent of capacity. Four districts advanced, three declined and five were at the same rate as the prior week. A year ago the rate was 98½ per cent; two years ago it was 98 per cent, both based on capacity as of those dates.

Carnegie-Illinois Steel Corp. has blown out two blast furnace stacks for repairs, one at Farrel Works, Sharon, Pa., and one at Youngstown, O. Tennessee Coal, Iron & Railroad Co. has blown out its No. 5 blast furnace at Ensley, Ala., for relining.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended Apr. 10	Change	Same week 1942	Same week 1941
Pittsburgh	100	—1	96.5	102
Chicago	100.5	+1	104	101.5
Eastern Pa.	95	None	92	96
Youngstown	98	+1	92	97
Wheeling	89	+0.5	82.5	88
Cleveland	96	+3	90.5	98.5
Buffalo	90.5	None	93.5	90.5
Birmingham	100	None	95	90
New England	95	—3	90	90
Cincinnati	85	—6	96	94
St. Louis	93	None	93	98
Detroit	94	None	92	61
Average	99.5	None	*98.5	*98

*Computed on bases of steelmaking capacity as of those dates.

Jones & Laughlin Makes World Pig Iron Record

A new world's record for a single blast furnace was established in March by No. 3 stack of Jones & Laughlin Steel Corp. at Aliquippa, Pa., which produced 48,505 tons, at an average of 1565 tons per day. The prior record was held by a Bethlehem Steel Co. stack at Lackawanna, N. Y., with 46,246 tons, made in October, 1942.

Other new all-time marks were made by Jones & Laughlin works in March. The 44-inch blooming mill at Aliquippa rolled 171,440 tons of ingots for a new world record, breaking its own mark of 161,074 tons rolled in October, 1942. Rolled finished steel products shipped in March also established a new record, more than 3300 tons over any prior month.

Interlake Negotiating for 3 Maritime Commission Boats

Negotiations between Interlake Steamship Co., Cleveland, and the Maritime Commission are in progress looking to the transfer to Interlake of three large vessels now under construction for the commission, Elton Hoyt II, president of the company, announced in the annual report to stockholders.

Mr. Hoyt said that as one consideration Interlake would trade in for part payment a number of its smaller vessels, which will be chartered back from the commission for the duration to remain in service moving iron ore on the lakes. Company's 43 ships operated at capacity the last two years.

Interlake's net income for 1942 was $1,339,584, equal to $2.26 a share, compared with $1,853,264, or $4.10 a share in 1941.

March Plate Output Reaches New High

Production of steel plates in March set a new record at 1,167,679 net tons, compared with the former peak of 1,135,413 tons in January. In February, 1943, production was 1,072,000 tons and in March, 1942, it was 878,726 tons.

Shipments to Maritime Commission shipyards approximated 500,000 tons and other wartime agencies took heavy tonnages. Plates in March took approximately one-fifth of ingot output and now constitute the largest tonnage product.

More than 400,000 tons went to the Army and Navy for tanks and other mobile equipment, ordnance, aircraft carriers, destroyers, escort and other war vessels.

Continuous strip mills converted to roll plates shipped 563,302 tons, compared with 529,315 tons in February, 1943, and 306,195 tons in March, 1942. Sheared mills also shipped a new high tonnage, 465,572 tons in March, compared with 424,167 tons in February, 1943, and 449,379 tons in March, 1942. Universal mill shipments were 138,805 tons in March, 118,519 tons in February this year and 132,152 tons in March, 1942.

Testimony on Laxity·Charges Heard by Government Group

B. F. FAIRLESS, president, United States Steel Corp., last Thursday presented a report on the recent evidence before the Truman committee of faked steel analysis at a special meeting called at the War Production Board by Hiland G. Batcheller, director, Steel Division.

While no formal announcement was made by WPB, Mr. Fairless is said to have told the meeting that an investigation has been made by him into the various charges of laxity at Carnegie-Illinois Steel Corp., and this investigation is continuing. He stated that a number of personnel changes have been ordered and other steps are being taken to avoid any repetition of lax practices.

He added, however, that his investigation had failed to show that there had been any profit for either the company or its employes involved in the practices complained of, and that the situation had developed solely as a result of war pressure and a desire to make a good showing. He said he could find no other motive in these developments.

His statement was supplemented by a report from Dr. R. E. Zimmerman, who appeared as a witness for the company.

Mr. Fairless made a verbal report at the meeting but has submitted a more detailed written report which will be studied by various WPB officials.

WPB Chairman Donald Nelson and his deputy, C. E. Wilson, were present and Mr. Nelson commented that the steel industry generally had made a excellent record and he hoped this would be maintained. At the same time he cautioned the steel representatives there must be no repetition of the practices which had been disclosed by the Truman committee.

The meeting was called by Mr. Batcheller in order to receive a more detailed report on the charges before the Truman committee and for a general discussion of the whole situation. It was indicated afterwards that no formal statement of conclusions would be made by WPB and it was uncertain just what action this agency would take.

It is unofficially reported that Admiral Vickery of the Maritime Commission said at the meeting that if he had been inspector on the Kaiser job he would have passed the plates which were rejected. Admiral Robinson, procurement officer of the Navy, represented that department.

At Pittsburgh, a federal grand jury convened today to hear the accusations against Carnegie-Illinois.

CRUISER CONVERTED TO AIRCRAFT CARRIEk

U. S. S. CABOT, aircraft carrier converted from a cruiser, leaves the way of the New York Shipbuilding Corp., Camden, N. J. Note permanent structural steel framing. NEA photo

Restrictions on Manufacture Of Soil Pipe Not Relaxed

No relaxation on restrictions covering the manufacture of cast iron soil pipe will be permitted by WPB, it was announced last week. At a soil pipe industry advisory meeting in Washington last week it was announced that efforts are being made to assist producers in disposing of existing stocks of heavy pipe and fittings. It was suggested that pipe and fittings and job castings be segregated in reporting inventories.

Hand File Reconditioning Would Save 600 Tons of Steel

Indicating that conservation of 600 tons of high-carbon steel and a substantial saving of man-hours probably can be attained through widespread application of "hand file reconditioning". The WPB Conservation Division is encouraging war plants to investigate the practice.

Leading aviation, ordnance and industrial plants have indicated the use of reconditioning files adds about 60 per cent to the original life of the file and that cost of reprocessing is only from one-half to one-third the cost of a new file. Deliveries of reprocessed files are more prompt than deliveries of new files.

The Petroleum Administration is studying the construction of a new pipeline to supply Midwestern refineries with additional West Texas crude oil. A proposal submitted to the Department of Interior provides for a privately-financed line of 383 miles, requiring 42,845 tons of steel.

Eliminates Unnecessary Items; No Real Threat to Trade Names

WASHINGTON

MEN behind the War Production Board's simplification program declare that recent editorials which criticize the program as constituting a threat to the continuance of trade names, company identities and distribution procedures are without any foundation in fact.

The simplification program is aimed at eliminating unnecessary items in any type of goods. It also is aimed at making the best use of our materials and labor by protecting consumers against "under-manufacturing," while at the same time eliminating "over-manufacturing."

For example, a consumer has complete freedom to buy the make of flashlight that he prefers, but there must be assurance that he can get a battery that will fit his flashlight. Before the war there were 27,000 varieties of padlocks and cabinet locks; WPB simplification reduced this to 2200 different locks, ample to meet every requirement, but not cutting out any trade names. Similarly automobile batteries were reduced from 100 types and sizes to 16, sufficient to afford a choice to meet any need. Before the war 54 different rock crushers were made; this has been reduced to nine. Many other simplifications have been effected during the war and many more are under contemplation. Now awaiting formal approval is an order which would immediately set up new simplifications.

In no case, it is pointed out, is there a threat against trade names or against advertising or against distribution methods.

Save Man-hours and Materials

Through simplification, as also is the case through standardization, there not only is an important saving in man-hours and in the use of materials, but the problem of replacement parts is greatly simplified. As an example, a good many rock crushers are being used by our troops in the African campaign; as a result of simplification of rock crushers, it is not necessary to transport and store as many replacement parts as would have been necessary before simplification.

In an article in the February issue of *Dun's Review*, Howard Coonley, director of the Conservation Division of the War Production Board, declared that the 85 or more completed simplification orders issued by WPB represent only a small fraction of the possibilities for simplication and that "it would be within reason to expect ten times as many simplification orders and schedules to be issued in 1943, covering all major lines of industry and certainly the great mass of the laboring population."

Mr. Coonley estimated that such a simplification achievement would release some 5,500,000 workers for the most essential war production. It would save the equivalent "of building new furnaces to produce some 5,000,000 tons of steel."

The first 75 simplification orders in 1942, he said, saved 600,000 tons of steel, 17,000 tons of copper, 227,000 tons of wood pulp, 35,000 pounds of solder, 180,000,000 yards of cotton, wool and rayon cloth, 450,000,000 board feet of lumber and so on.

Eases Transportation Load

Mr. Coonley also pointed out the tremendous importance of simplification with respect to transportation since it eliminates a tremendous load formerly handled by the various transportation media.

The important thing for manufacturers to realize in connection with simplification is that there is nothing arbitrary or high-handed about the proceedings. Every care is made to prevent shocks and dislocations from being any more severe than is necessary. The practice in all cases is to effect simplification in agreement with the members of each industry involved.

It is pointed out that simplification is nothing new in this country. It first came into being during World War I under the auspices of the War Industries Board. After the war Herbert Hoover, as Secretary of Commerce, was instrumental in bringing about much simplification; one of his accomplishments was to reduce varieties of paving brick from 66 to 20. Soon after the Division of Simplified Practice was formed in the National Bureau of Standards and on June 4, 1942, there were approximately 150 simplified practice recommendations in effect.

These recommendations had, for example, reduced the number of ice cream cartons and molds by 97 per cent, the number of varieties of blankets by 86 per cent, the varieties of pipe fittings by 65 per cent. In the latter case the actual reduction in numbers of gray iron, malleable iron and brass and bronze fittings was from 8566 to 2969 types.

It is pointed out that the simplifications prior to the emergency period of this war never disturbed distribution methods, and never discouraged advertising by individual manufacturers in the industries involved. There is no reason to expect that it will have any such disturbing effect during the war even though simplification is being sharply accelerated in the interest of the war effort.

There is only one threat to normal distribution and advertising procedure on the horizon—and it comes from another direction entirely. That is the threat due to transportation bottlenecks. In the interest of utilizing transportation efficiently one group points out that beer should not be shipped from St. Louis to San Francisco and from Baltimore to Chicago. Soap should not be shipped from Cincinnati all over the country when it is being made in various other locations that could serve local needs. The same argument is raised in regard to packaged cereals from Battle Creek, furniture from Grand Rapids and many other trade-named products that have a national market.

This matter of "cross-hauling" for some time has been under consideration by the various industry committees of WPB. What will be the outcome is not at all clear. The Office of Defense Transportation is leaving the matter to the industries in the belief that the entire matter is so complicated that it can be decided only in the individual industries and by people familiar with the problems of their industries. It may be stated that the ODT is "not impressed" with the progress so far made in reducing the amount of cross hauling.

Restrictions Eased on Production of Fan Parts

Manufacture of certain repair and replacement parts for portable electric fans on a limited basis has been provided for in an amendment to order L-176. Amended order permits use of copper and copper-base alloys in production of parts which conduct electric current, as well as in bearings, if no other metal is practicable. Production of fan blades and motors also is permitted. Each manufacturer must restrict production of all parts so that his inventory does not exceed the total number of parts of each type that he had sold the preceding six months.

No manufacturer or distributor may deliver a new part unless a similar used part is given to him in exchange, or unless the used part is being held by the distributor or dealer. Inventories must be reported on PD-663 on or before the tenth of each month.

WINDOWS of WASHINGTON

Tunnel type driers used most frequently for dehydrating food. . . Spray and drum-type machines reduce products to powdery or flaky form. . . Meat drying program requires metal machinery

VITAL importance of the food dehydration program to the war effort as a method of conserving precious cargo space was briefly discussed in this department last week. Authorities say that one freighter can carry seven times as much of the dehydrated product as compared with the unprocessed type. All that need be added is water when preparing for consumption and no difference in taste is noticeable.

After the initial process of cleaning and cutting, the food is rushed through a "blanching" operation which inactivates the enzymes. From there it is transferred to a drying unit. Vitamin losses vary with the drying methods used, but data obtained up to this time are not conclusive.

Tunnel type driers are most frequently used and they can be parallel, counter, center-exhaust or cross flow. The air in all types is heated to around 145 to 150 degrees Fahr.

Center-Exhaust Drier Appears

In the parallel-flow type the air current moves in the same direction as the material. Hot air enters at the "wet end" and is removed at the "dry end", so that the fresh material is in contact with the hottest, driest air, which is ideal. The dry end, however, is in contact not only with the cooler air current but also with a more or less saturated current, which is not so ideal.

In counter-flow driers these conditions are reversed. The hottest and driest air enters at the dry end while the wet end is in contact with the cooler and partly saturated air.

Both of these types are being superseded by the center-exhaust type, wherein two streams of air are used, each moving from one end toward the center of the dehydrater. In this way each half is to some extent independent of the other. Usually a partition of canvas or some other material separates the two ends, this being removed only when the vegetable-laden trucks are moved forward. This type affords opportunity to regulate temperature in each half and comes nearer to giving ideal conditions in each.

In cross-flow types the air blows across the loaded vegetable trays and is recirculated to other trays, that is, each truckload of trays in effect becomes a cabinet but with unimpeded movement of trucks.

Cabinet driers comprise either single compartments or a series of compartments. They permit regulation of temperature and humidity during the drying, with ease not possible in other types.

Spray and drum-type dehydraters are used to reduce products to a powdery or flaky form. Such powders or flakes are of value in some soup stocks, as condiments or for other uses where size of particles is unimportant.

Vacuum dehyraters are in use to a very limited extent on vegetables. They may operate either continuously or on the "batch" system. Temperatures employed range from below the freezing range of the material to be dried, up to perhaps as high as 115 to 120 degrees Fahr. Vacuum dehydraters require large amounts of metal in proportion to output of product, and they also require considerable auxiliary equipment, particularly in the form of vacuum pumps or steam ejectors. Due to the critical supply of metals, therefore, current conditions do not encourage wide adoption of equipment of this type.

It will be understood from the above that motor-driven fans and air ducts are essential parts of vegetable drying systems. Instrumentation also is necessary to insure accurate control of temperature and amount of humidity in the air. The amount of humidity is best observed by means of wet and dry bulb readings. Where steam is employed for blanching vegetables, one or more boilers are required, together with requisite piping, valves, etc.

Handling facilities have to be provided to transfer the dried vegetables to the packaging department—which department must be especially equipped for the reason that insect-proof and moisture-proof packaging is essential. Tin cans—hermetically sealed or with friction tops—are widely used and generally preferred. The size most commonly used holds five gallons. However, the Quartermaster General of the Army now is encouraging shipment of certain vegetables in five-gallon cartons. This method eliminates metal consumption.

A feature of packaging is that with many dehydrated products it is customary to exhaust the air in the containers and replace it either with carbon dioxide or nitrogen. Research has shown that dehydrated vegetables packed in either of those gases remain superior in flavor and in vitamin content to those which have been allowed to remain in contact with the oxygen in the air. Naturally, additional equipment is necessary to carry out this operation.

Sanitation Very Important

Additional equipment also is necessary in many cases in order to dispose of wastes—both liquid and solid—that otherwise would accumulate when preparing vegetables for dehydration. Dehydration plants must be kept absolutely clean and sanitary. Wastes, therefore, must be gotten rid of as fast as they are created. What a problem this can be is illustrated by the fact that the organic material contained in the wastes from a potato dehydration plant of 20 tons (unprepared basis) daily capacity is roughly equivalent to that contained in the sewage flow from a town of 8000 people. As another example, consider that when a cabbage dehydration plant takes in 1000 pounds of fresh cabbage, there immediately develops a loss of 150 to 200 pounds of solid material, discarded in decoring heads and removing tough outer leaves.

Selection of material for construction depends on two main factors: First, facilities already in existence and, second, the critical material shortages involved. Lots of vegetables right now are being dehydrated in plants originally established for drying fruit. Most of these plants employ wooden vats, trays and so on for the reason that it generally has been customary to use such wooden equipment in drying fruits. Technicians specializing in the vegetable

A SPECIAL REPORT TO INDUSTRY

FOOD DEHYDRATION

This is the second and concluding article on the potential use of metals in dehydrating foods for shipment abroad and the various processes involved before sanitary packaging meats and vegetables.

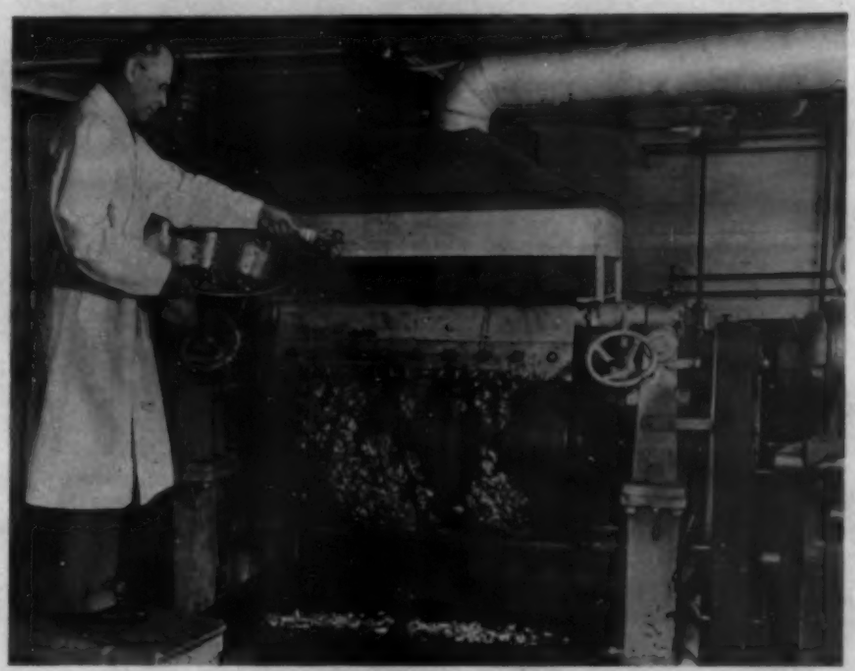
drying program during this war do not like wood. For one thing, it is not as sanitary nor as heat resistant as properly selected metals. However, they are forced to urge use of wood or other relatively plentiful materials in order to conserve scarce metals.

One of the most difficult problems in equipping dehydration plants is to provide heated surfaces. Fine radiation is what is wanted and the few manufacturers of this product are swamped with orders. Furthermore, they are making such radiation out of steel in order to conserve copper—but steel requires 25 per cent more surface to provide equal radiation. The use of steel also is complicated by the fact it is necessary to coat it suitably in order to prevent deterioration, as well as food spoilage, from rusting. It appears that porcelain enameled steel will be used to a considerable extent in the program.

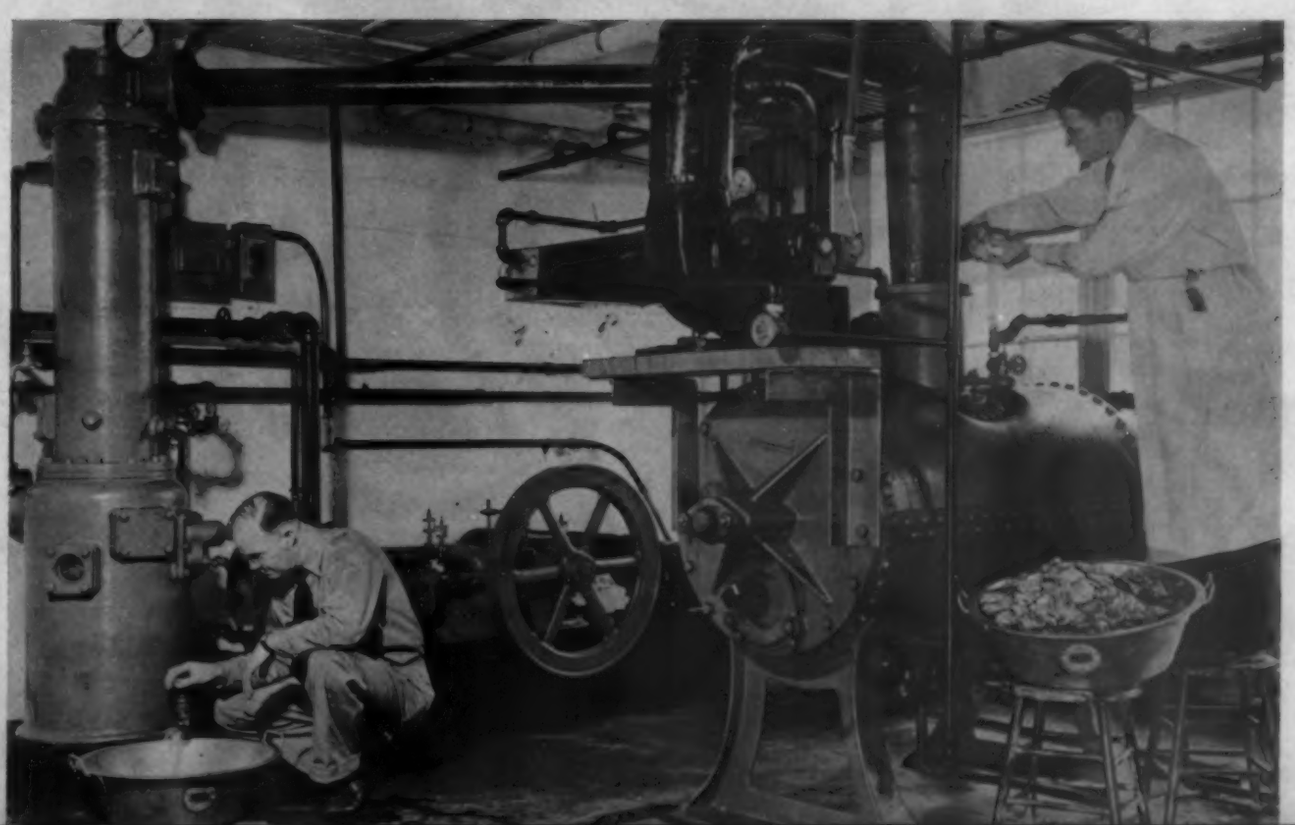
Another difficult problem is to meet the need for steam generating equipment. The typical carrying plant, when swung over to vegetable dehydration, usually does not have enough boiler capacity. Then, too, most of these plants are in the Pacific Coast area, where it is the custom to use oil or gas for heating air —the air being blown around flues. When oil is used, there always is the chance that the vegetables may be contaminated by it. That situation is being studied and it may be necessary to use direct-fired furnaces. Dehydration plants in the East usually use steam or have direct-fired heating surfaces so the contamination problem does not exist to as great an extent as on the West Coast.

All in all, there are a lot of things still to be learned about dehydration, particularly about the design of dehydrating equipment. Some of the equipment that has been built recently has not been properly engineered. Some manufacturers who have sought to help along the dehydration program have made costly mistakes.

Manufacturers who participate in the dehydration program, of course, can get the priority benefits that apply to essential war work, so that the potentialities should be of special interest to many still engaged in work not classified as essential war work. Such manufacturers



Department Engineer W. A. Noel runs a trial lot of ground raw meat through a double-drum drier, at left. Extensive research work is in progress to determine best methods of meat dehydration and best types of driers. The vacuum rotary drier shown below is used at the Meats Laboratory of the Department of Agriculture, Beltsville Research Center. C. F. Dunker feeds 60 pounds of raw pork to the drier. This drier extracts 41 pounds of water. W. E. Gray, department engineer, draws some of the water from the condenser at left



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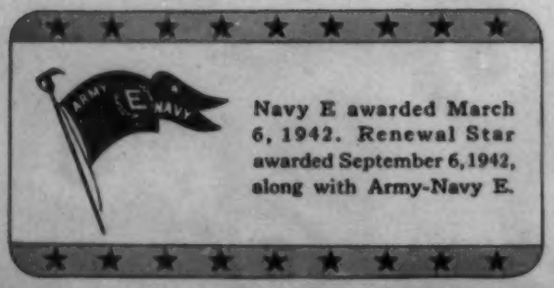

Navy E awarded March 6, 1942. Renewal Star awarded September 6, 1942, along with Army-Navy E.

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will do well to get in touch with the Bureau of Agricultural and Industrial Chemistry, Department of Agriculture, and receive information, in both oral and mimeographed form, on which they can base their plans. This information may be obtained from the bureau in Washington. Or it may be obtained from the bureau's Western Regional Research Laboratory at Albany, Calif. This material is replete with details about the materials to be used and the designs that have been found to work satisfactorily. It is accompanied by blue-prints of designs whose value has been demonstrated.

The foregoing portion of this discussion has been concerned mostly with vegetables.

In addition there is a vast meat drying program on which a start barely has been made. This program should be of special interest to readers of STEEL for the reason that in drying meat the apparatus is such that there is no acceptable substitute for metals in much of it. A process has been worked out whereby rotary vacuum driers, such as formerly were used for the dry rendering of lard, are employed.

There are several other processes in use or being tried out, and a number of experimental machines and processes are being used by research agencies, so that meat dehydration is not yet done by any standard practice. It may be said that the dried meat now being produced stands up well in storage. In view of the kinks still to be ironed out, however, prospective manufacturers of meat dehydrating equipment will do well to make no sizable investments until they are sure they are on safe ground.

For example, there is no definite proof that contact with iron and steel, or galvanized steel, is a factor contributing towards rancidity of fat in dried meat during storage. Naturally, this question must be answered conclusively before preparing to make dehydration equipment out of steel on a large scale.

Large quantities of eggs and milk are being dehydrated for shipment abroad for our own forces and as a part of Lend-Lease aid to other countries. Inasmuch as such drying has been carried on successfully on a large scale over a good many years, this part of the program does not involve the unsolved problems that are injecting some confusion into vegetable and meat dehydration. Spray driers are used for milk and eggs. These liquid substances are injected under heavy pressure through a minute orifice, this stream being met by a jet of heated air which instantaneously converts the spray into dry powder. Spray driers employ steel chambers, either glass-lined or coated with a suitable thermoplastic paint capable of standing up under this type of service.

A development now under way also may prove of interest to manufacturers of presses. This is the use of such equipment to compress dehydrated food so that it will occupy even less bulk space. While it looks promising, this development has not yet emerged from the experimental stage.

Ground raw meat as shown in the illustrations on preceding page subsequently is dehydrated in a cabinet drier wherein its moisture content is further reduced 10 per cent or less

Readers interested in the business opportunities held forth by the food dehydration program can get still further understanding by studying the accompanying illustrations, as well as those that appeared here in the April 5 issue.

A stack of trays holding pretreated cabbage is run into a cabinet. Photos by United States Department of Agriculture

Operation Under CMP During Transition from PRP Clarified

TRANSITION from the Production Requirements Plan to the Controlled Materials Plan is being expedited in an orderly course, but some confusion has been noted due to conflicting or overlapping orders issued under the two plans.

Orders bearing allotment numbers under CMP now are being given preference over orders under PRP and also over any preference rated orders without allotment numbers. As an aid to steel producers and consumers in operating under CMP regulations, War Production Board has compiled the following questions and answers:

A PRP unit was authorized to receive 1000 tons of carbon steel for first quarter of 1943 for production materials. How much carbon steel may the unit purchase and receive in the second quarter?

Answer—The PRP unit may place rated purchase orders, using its first quarter production material ratings, for 700 tons of carbon steel or 70% of its first quarter authorization for receipt in the second quarter. If by March 31, 1943 it has not been specifically advised to the contrary by the War Production Board it may then place rated orders for and receive the remaining 30%, or 300 tons.

A PRP unit was authorized to receive 1000 tons of carbon steel for production material in the first quarter of 1943. Of April 1 a CMP allotment of 500 tons of carbon steel is made to this company. How much carbon steel may the unit receive during the second quarter?

Answer—The PRP unit may receive a total of 1000 tons during the second quarter. It may rate and receive the entire 1000 tons through the use of its PRP ratings, or it may use the CMP allotment for 500 tons and PRP ratings for the remaining 500 tons.

Another Question Clarified

In the above example, assume that the PRP unit receives a CMP allotment of 1200 tons of carbon steel on April 1, How much carbon steel may the unit receive during the second quarter?

Answer—In this case the PRP unit may use the CMP allotment for the purchase and receipt of a total of 1200 tons. It must not duplicate purchases under PRP and CMP.

A PRP unit was authorized to receive 1000 tons of carbon steel on its PD-25A certificate for the first quarter of 1943. On Feb. 10 it received a PD-25F certificate authorizing an additional 200 tons for receipt in the first quarter. On March 5 a PD-25F certificate authorized an additional 100 tons for receipt in the first quarter. How many tons of carbon steel may the PRP unit purchase for delivery in the second quarter?

Answer—The basis to be used for determining the quantity of steel which may be purchased for receipt in the second quarter is the 1000 tons authorized on the PD-25A certificate plus 200 tons authorized on the first PD-25F certificate received on Feb. 10. The 100 tons authorized on the PD-25F issued on March 5 may *not* be included since this PD-25F was issued after Feb. 28. Priorities Regulation 11A states that each PRP unit may apply production material ratings authorized for the first quarter of 1943 to 70% of the quantities of listed materials for production to which it was authorized to aply ratings by the first quarter PD-25A plus first quarter PD-25F certificates issued prior to March 1. Therefore, at any time prior to April 1, the PRP unit may place rated purchase orders for delivery in the second quarter of 840 tons of steel (70% of 1200 tons). Unless it has been specifically advised to the contrary, prior to April 1, 1943, it may then place orders for 360 tons, the remainder of the 1200 tons total.

A PRP unit specifically applied for and was authorized $2000 worth of Bearings: ball, roller, and precision (Line 2 of Section F), for production materials for the first quarter of 1943. How many bearings may the unit purchase in the second quarter, assuming that the unit has not heard from its industry division prior to April 1 and that no allotments have been received?

Answer—It may purchase the number of bearings necessary to carry out the production schedule permitted by the amount of listed materials authorized.

A PRP unit was authorized $10,000 in the first quarter of 1943 for "maintenance, repair, and operating supplies not elsewhere classified." How much maintenance, repair and operating supplies may the PRP unit purchase in the first quarter of 1943, and in the second quarter of 1943?

Answer—Maintenance, repair and operating supplies purchased for delivery in the first quarter are governed by the

MECHANICAL LIFT WITH 2000-POUND "BLOCK BUSTER"

SPECIAL mechanical lift is used to tote 2000-pound "block buster" around the Seneca Ordnance Depot, Romulus, N. Y. The depot employs a number of women in jobs like these. U. S. Signal Corps photo from NEA

terms of the PRP Regulation, Priorities Regulation No. 11.

CMP Regulation No. 5 governs the procurement of maintenance, repair and operating supplies for delivery after March 31, 1943. Any purchases of maintenance, repair and operating supplies requiring delivery after March 31 are covered by the terms and provisions of that regulation.

In this case the PRP unit may purchase $10,000 worth of maintenance, repair and operating supplies for delivery in the first quarter and the quantity it may purchase for delivery in the second quarter is governed by the terms of CMP Regulation No. 5.

A PRP unit, on its first quarter PRP application was authorized to purchase and receive 100 *tons of steel during the first quarter and in Section H of its PRP application was authorized to place purchase orders for* 120 *tons of steel for receipt in the second quarter and* 80 *tons each for receipt in the third and fourth quarters of* 1943. *How much steel may it rate and receive during the second quarter, and what should the PRP unit do about the* 80 *tons authorized to it for receipt in the third and fourth quarters?*

Answer—it may rate and receive the full 120 tons during the second quarter. That is, it is not restricted to 70% of its first quarter authorization prior to April 1 or 100% of its first quarter authorization after April 1. As to the quantities authorized for receipt in the third and fourth quarters of 1943, rated purchase orders placed pursuant to such advance quarter authorizations need not be cancelled or re-rated. However, none of the quantities covered by the authorizations for the third and fourth quarters of 1943 may be received without an allotment.

Up-Rating of Order Relates Back To Original Date of Issuance

UP-RATING of an order by the application of an allotment number relating back, for the purpose of determining the sequence of delivery, to the date on which the original rating was applied to the order, has been clarified by the War Production Board in an interpretation of CMP Regulation No. 3.

The interpretation points out that the re-rating accomplished by the application of an allotment number is governed by the re-rating procedures established in Priorities Regulation No. 12. This means that the sequence of deliveries is to be determined as if a rated order, to which an allotment number is applied, actually bore the allotment number at the time it was first placed.

40 Days' Grace Granted

The interpretation, it was emphasized, covers only the use of allotment numbers as a re-rating device and does not cover the placement of authorized controlled material orders, which is governed by CMP Regulation No. 1.

Persons having orders which are uprated by the use of allotment numbers must make any necessary adjustments in production and delivery schedules promptly upon receipt of the allotment numbers. However, no producer will be required to terminate or interrupt a production schedule within 40 days after receipt of the re-rating in any case where termination or interruption would result in a substantial loss of production. Producers are also prohibited from diverting materials, specifically produced for orders bearing preference ratings higher than A-2, and delivering them under higher rated orders if such material is completed at the time the allotment number is received or is scheduled for completion 15 days after the allotment number is received, unless specifically directed by WPB to do so or unless the material is to go into production of emergency items.

Release Fabricated Steel for Some Civilian Products

Many civilian products in which the use of steel has for some time been barred will soon be available to consumers in limited quantities as a result of an action announced by the War Production Board which releases certain stocks of partially or wholly fabricated steel parts.

By an extensive revision of Order M-126, iron and steel conservation, these inventories, which have been frozen for three to eight months, are permitted to be used in about 20 items for which they were originally intended. The inventories are estimated roughly at about 3000 tons. No new steel may be used in the items involved.

Many of the products of which there will be a limited production as a result of the action are not essential. The frozen inventories are being released because they consist of only a small tonnage of light gage steel, not satisfactorily usable in war production or for scrap purposes.

NAVAL GUN BARRELS NEAR COMPLETION AT WASHINGTON

HEAVY naval gun barrels undergo the finishing stages of boring at the Navy Yard, Washington. U. S. Navy photo from NEA

PRIORITIES–ALLOCATIONS–PRICES

Weekly summary of orders and regulations issued by WPB and OPA, supplementary to Priorities-Allocations-Prices Guide, published in Section II of STEEL, Dec. 14, 1942

CMP REGULATIONS

No. 1 (Direction No. 1), issued March 26. Specifically provides that orders which were displaced in mill production schedules prior to March 22 need not be reinstated.

No. 2 (Direction No. 1), issued April 1. Exempts telephone companies from the 60-day inventory restrictions of CMP Regulation No. 2 since they are now governed by Utilities Order U-3.

PRIORITIES REGULATIONS

No. 11A (Amendment): **Production Requirements Plan for Second Quarter of 1943,** issued April 1. Permits PRP units which do not process the materials listed in Regulation No. 11 but who purchase only fabricated items or materials other than those listed to apply during the second quarter the ratings which they were authorized to use by their first quarter PD-25A and PD-25F certificates to the same quantities of fabricated items and unlisted materials.

No. 8 (Amendment): **Reports,** effective April 3. Eliminates requirements for reports on any of the forms listed in Appendix A to the regulation. These PD forms are: 6, 6A, 13, 14, 30, 30A, 38, 41, 41A, 42, 42A, 43, 43A, 44, 44A, 45, 45A, 46, 46A, 47, 47A, 48, 48A, 52, 52A, 56, 56A, 57, 57A, 58, 58A, 63, 63A, 64, 65, 68, 68A, 74, 74A, 81, 81A, 93, and 119.

L ORDERS

L-7-c (Amendment): **Domestic Ice Refrigerators,** effective March 29. Establishes production quotas for 26 manufacturers and provides that orders bearing ratings of AA-5 or higher may be filled in excess of the quotas.

L-59-b (Amendment): **Metal Plastering Bases,** effective April 2. Permits use in connection with metal reinforced insulation blankets and pipe covering, metal reinforced filters and oil reduction equipment. Permits sales of material in possession of any person prior to April 2.

L-193 (Amendment): **Conveying Machinery and Mechanical Power Transmission Equipment,** effective April 5. Restricts use of steel in continuous stream conduit elevator-conveyors. Exempts following parts of elevator-conveyors from this prohibition: terminal and curved sections, straight casings for carrying strands, and wearing bars for return strands. Bans use of steel exceeding $\frac{1}{16}$-inch in thickness for these exempted items.

L-126 (Amendment): **Refrigeration and Air Conditioning Equipment,** effective March 27. Amends the first three and adds the last three schedules as follows: Schedule I—Restricts production of self-contained drinking coolers to 5, 10 and 20 gallon marine types; Schedule II—Permits production of certain types of water-cooled condensing units for specific uses; extends restrictions on use of metal bases and fan shrouds; prohibits use of copper or copper-base alloy tubing or pipe for specific purposes; Schedule III—Changes amounts of nonferrous metals used in making refrigeration condensing units under certain specified conditions; imposes controls on use of steel tubes in water-cooled condensers; Schedule IV—Reduces number of sizes and types of refrigeration valves, fittings and accessories; requires substitution of ferrous metals for nonferrous in construction of certain essential parts; Schedule V—Restricts output of commercial reach-in refrigerators to four sizes and of walk-in refrigerators to nine sizes; limits use of metals used in component parts; Schedule VI—Prohibits use of copper or copper-base alloy or pipe for refrigerant connections with certain stated exceptions; prohibits use of copper tubing or pipe for service connections.

L-211 (Amendment): **Schedule III, National Emergency Steel Products,** effective March 31. Permits manufacture of 60-inch poultry netting in addition to the 48- and 12-inch widths.

L-212: Incandescent Lighting Fixtures, effective March 31. Restricts use of metal used in manufacturing of fixtures; orders certain simplifications and a reduction in number of sizes and shapes permitted to be produced.

L-229 (Revocation): **Railroad Equipment,** issued April 5. Revokes order which had limited output by producers of specified replacement parts and purchase by carriers of new parts. Covered by new order P-142.

M ORDERS

M-21 (Amendment): **Iron and Steel,** effective April 1. Permits deliveries on authorized controlled material orders; by distributors in accordance with CMP Regulation No. 4. Provides for reporting of shipments wherever possible by CMP allotment numbers or symbols.

M-21-b-2: Merchant Trade Products, Warehouses and Dealers, effective April 1, 1943. Supersedes order M-21-b, which is revoked. Permits warehouses to place orders (but only with producers with whom they have a base tonnage) for certain merchant trade products up to the percentage of mill production set aside for warehouses under Steel Division Production Directives. These orders are considered authorized controlled material orders. Provides that warehouses can obtain a separate group of products (such as wire fence, bale ties) from their regular supplying producers up to a certain percentage of their base tonnage. These orders are not considered controlled material orders unless copy of CMP-11 is filed with producer, indicating the tonnage delivered during preceding 90 days on AA-5 or higher orders.

Dealers must operate entirely on stock replacement basis but can shift freely among various merchant trade products.

File PD-98-e to shift total base tonnage of any one product group from one producer to another. Form PD-83-g may be used up to July 1 instead of CMP-11 to extend allotment numbers of specific claimant agencies or orders rated AA-5 or higher. File PD-83-i quarterly if base tonnage of specified products exceeds 240 net tons. Producers of products for which warehouse load has been established file PD-83-f.

M-59 (Replacement): **Palm Oil,** effective March 24. Order re-issued by Department of Agriculture as Food Distribution Order No. 38, transferring control to Food Distribution Administration. Continues same restrictions as M-59 on processing, delivery and use of palm oil but provides exemption for any person using less than 2000 lb. per quarter.

M-68 (Replacement): **Materials for Oil Industry,** effective March 31. Order replaced by Petroleum Administrative Order No. 11. Changes in the new order include: definition of "maintenance or repair" excludes any restriction because of accounting practices and includes capital additions not exceeding $500 in material costs; prohibits installation of pumping equipment except where wells are no longer capable of flowing their allowables; permits construction of gathering systems to connect wells to a pipe line provided material costs do not exceed $2500 and provided new installation does not duplicate existing facility; substitutes PAW forms 3 and 4 for PD-214A, B and C.

M-193 (Replacement): **Glycerine,** effective March 24. Order re-issued by Department of Agriculture as Food Distribution Order No. 33.

M-293 (Amendment): **Critical Components,** effective March 31. Sets forward to May 1 from April 1 date after which deliveries of items on the Class X list may be made only according to schedules filed with WPB; and Class Y items may be delivered only when authorized.

M-303: Calcium Metal, effective April 1. Places under allocation products containing the element calcium not in chemical combination and in which any metallic constituents other than calcium do not constitute more than 15 per cent by weight. Application for authorization to use or accept delivery of calcium metal must be filed on form PD-600 with WPB and supplier by 15th of preceding month; as soon as possible for April. Application for authorization to make delivery must be filed by producer or distributor with WPB on form PD-601 by 20th of month preceding delivery month.

P ORDERS

P-88 (Revocation): **Railroad Material,** issued April 5. Revokes order which had assigned preference ratings for maintenance, repair, operating supplies required by railway transportation companies. Control transferred to order P-142.

P-100 (Revocation): **Repair, Maintenance, Operating Supplies,** effective April 2. Revokes order since producers who formerly used ratings assigned under P-100 for MRO supplies are permitted to operate within terms of CMP Regulation No. 5. CMP Regulation No. 5 assigns rating of AA-1 to producers covered in Schedule 1, AA-2X to those covered in Schedule 11, and A-10 to business activities not mentioned in either schedule. Provides that any serial-numbered copy of P-100 issued to a producer in Canada shall remain in effect until it is specifically revoked or until the Canadian producer becomes eligible to apply ratings assigned by CMP No. 5.

P-142: Transportation System Material, effective April 5. Supersedes CMP Regulation No. 5 insofar as the larger transportation systems are concerned. Covers steam, electric and terminal railroads, private car line companies, electric street railway and trolley coach systems and common carrier passenger motor bus systems, except those which can obtain all of the controlled material requirements at retail or from warehouses. Each of the above systems must file its requirements on PD-844, quarter by quarter, including controlled materials, with WPB which will assign preference ratings. WPB also will assign upon application specific preference ratings to deliveries of specific materials needed for emergency repairs. Certification MRO-P-142 and serial number must be used in applying preference rating and in obtaining controlled materials. Liberalizes former resale provisions. Restricts inventories to 60-day requirements.

U ORDERS

U-1-e: Electric, Gas, Water, and Steam Utilities—Materials, effective March 31. Authorizes water line extensions of not more than 250 ft. to provide water for gardens but forbids purchase of copper pipe for this purpose.

U-3: Telephone Equipment, effective April 1. Replaces order P-130. Assigns rating of AA-1 for purchase of MRO supplies, other than controlled materials. CMP allotment symbol MRO-U, accompanied by a specified certification, may be used to acquire controlled materials for MRO supplies and for necessary new construction on war projects. Rating assigned to the project may be extended to communications supplies.

U-4: Telegraph Equipment, effective April 1. Replaces order P-132. Assigns rating of AA-1 for purchase of MRO supplies, other than controlled materials. Prohibits use of CMP allotment symbol for construction on war projects.

U-5: Wire Communications Equipment, effective April 1. Supersedes order L-148. Limits transfer of equipment, either telegraph or

(*Please turn to Page* 156)

★ ★ ★ ★ ★ ★

You can't spell VICTORY with "T" an absent

JOHN F. NOON
Hyatt Roller Bearing
Precision Grinding Dept.

John Noon points with pride to the slogan he originally entered in a Hyatt employe's contest and which has since swept the country like a whirlwind.

So many requests have come in for permission to use the above contest-winning slogan ... originated by John Noon, a Hyatt worker ... that we have had extra posters printed in color for free distribution among other war production plants.

These are now available ... singly or in reasonable quantity ... in either 19x25-inch or 8½x11-inch sizes.

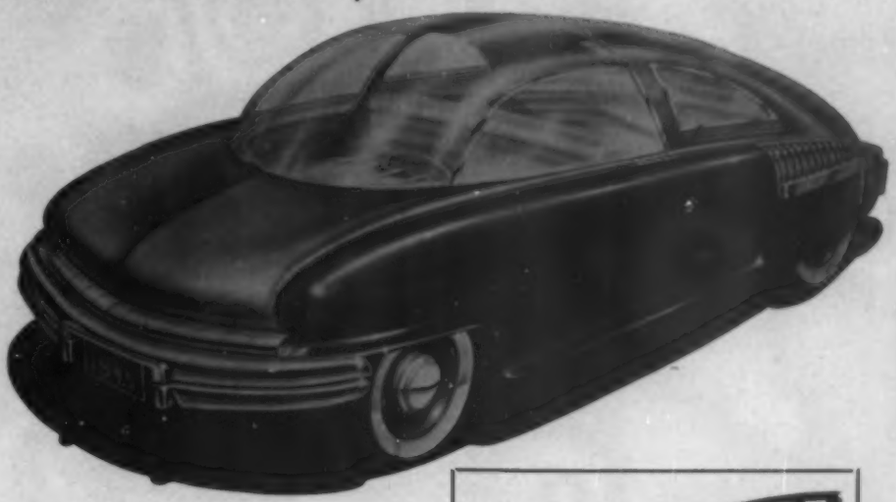
Please make your request on company letterhead and be sure to mention size desired.

Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.

By A. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

First postwar auto will be similar to 1942 car but with "refinements". . . Keen competition foreseen among materials but ferrous metals expected to continue as basic product for motorcar industry



WHILE it may be argued premature to launch a discussion of the world of tomorrow before today's battles are ended and the shape of such a world can be defined, nevertheless, the role of metalproducing and metalworking industries in years ahead is a subject of vital concern. Managements are recognizing this and, reservedly, are devoting some attention to formulating their concepts of what is to come.

Believing that stimulation of interest in considering possibilities for metals in the future may go hand in hand with the urgency of today's war production, STEEL *herewith presents an extended analytical search into tomorrow's trends in automobiles, seasoned throughout with at least a reasonable amount of today's knowledge of metals and their uses.*

Critical comment on this series is welcomed, in fact invited. Interesting opinions will be published at intervals.—THE EDITORS.

ANY attempt to draw up outlines of the automobile of tomorrow must be based first on fairly definite knowledge of when the current global war will terminate. At the moment this is purely guesswork. Naturally plans are being drawn up and dated as to the probable end of the conflict, but their accuracy is entirely in the laps of the gods. Peak of U. S. military effort probably will be reached late in 1943, with a successful conclusion of hostilities hoped for in 1944 or early 1945. Opinion also is veering to the belief that the German phase of the struggle may be concluded before the Japanese.

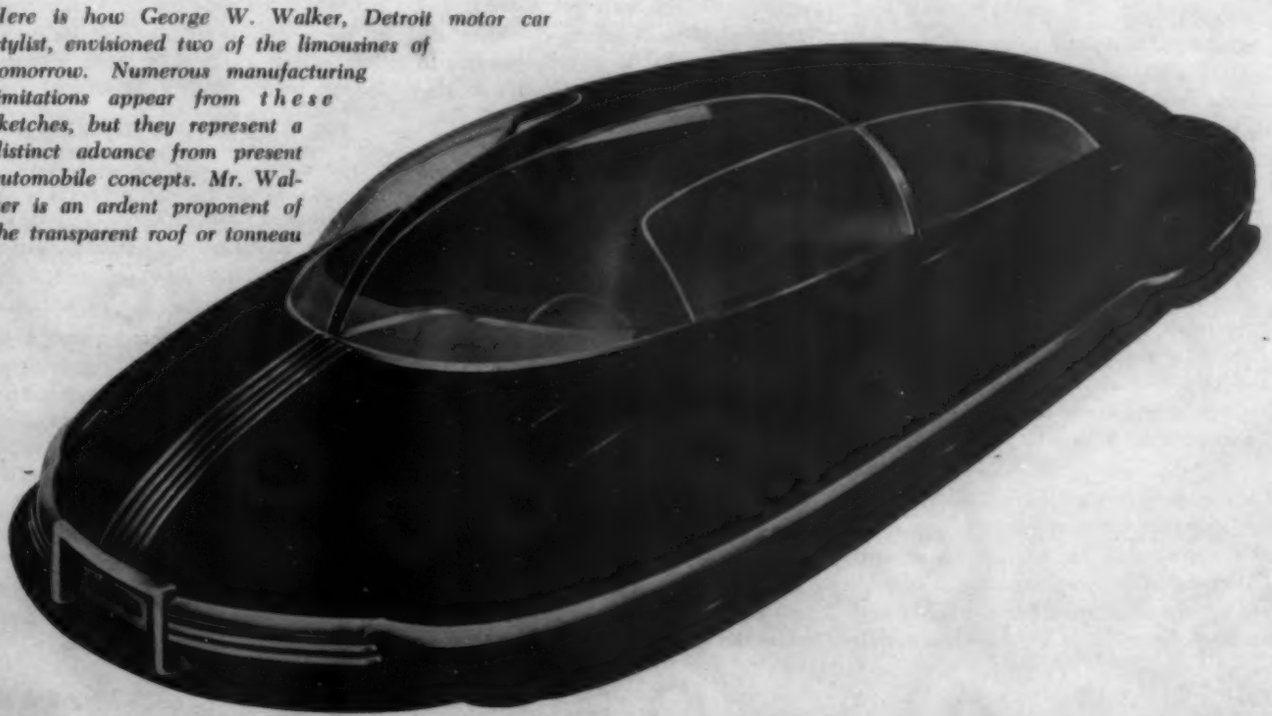
This may mean new automobiles will have to start from scratch, although early in 1943 most automotive officials were predicting that when production resumed cars would be virtual duplicates of the 1942 models which were suspended in February, 1942. They

A SPECIAL REPORT TO INDUSTRY

THE POSTWAR AUTOMOBILE

This is the first in a series analyzing the postwar automobile, with primary emphasis on passenger cars, from the standpoint of possible changes in materials, subassemblies and manufacturing technique.

Here is how George W. Walker, Detroit motor car stylist, envisioned two of the limousines of tomorrow. Numerous manufacturing limitations appear from these sketches, but they represent a distinct advance from present automobile concepts. Mr. Walker is an ardent proponent of the transparent roof or tonneau



reasoned, and with sound logic, that when assemblies can be resumed the competitive emphasis will be on speedy re-conversion and the quickest way to get cars in the hands of dealers will be to make use of tools and dies for 1942 models, which only saw a few months' run out of a model year, and to make such minor embellishments and style refinements as may appear feasible in a short time.

The great motor car assembly plants have literally been torn apart in the conversion to war production. Machines have been retooled and regrouped where possible, otherwise transferred to plants which had need for them or, in the case of some equipment, rolled out into storage yards and covered with canvas. Conveyor lines have been ripped up and many of them scrapped to make way for new systems to handle war production. It would take probably six months at least to re-convert these plants to any semblance of motor car production; but any immediate resumption of output would have to be 1942 models with minor changes. The economy of the situation would permit nothing else.

We are concerned here not alone with "tomorrow" for automobiles as they might appear at the dawn of production, but more importantly with the impact of tremendous advances in the adaptation and fabrication of metals which the war effort has brought. Admittedly there has been little time in the past year for engineers and designers to spend on evolving new automotive concepts, still the upsurge in new materials and new processes will make its effect felt sometime in the not too distant future.

Prominent Designer Retained

One of the smaller auto companies is known to have retained a prominent designer at a monthly fee running into four figures for the express job of designing a postwar car. With this knowledge, the larger companies must be pursuing some active thinking on the subject, even if they deny the fact when questioned directly. However, the translation of a designer's ideas into steel and rubber and glass is much more complex than the mere sketching of some outlines on paper, and this preparatory activity is the one which consumes valuable time but which certainly will have to wait until peace is closer than it is now.

For the sake of discussion, let it be assumed that the first automobiles to appear after the war will be substantially what the public has become accustomed to in the past. From this point it may be of interest to proceed into the future and see what may be in store for the models to follow the postwar "emergency" car. To get a line on prospects, it is necessary to break the automobile down into its components—frame, body, motor, wheels, axles, springing, transmission, controls and accessories. But before doing this it may be well to make certain basic broad observations on the subject of materials in general as they apply to automobile construction.

First, consider the matter of plastics. It is true that great advances have been made in recent years, and are still being made, in molding and fabricating plastics to supplement, complement and replace metals. But plastics in general cannot yet be considered structural materials in the automotive engineer's sense of the word. They are moving in that direction, but they still suffer because of lack of strength, poor weathering qualities, high cost (both material and fabrication) and difficulties in forming, joining and particularly fastening.

Novel Accessories of Plastics

More years of research will be necessary to place plastics on a par with metals in respect to these qualities. Hence they must be kept in the field of ornamental, decorative, colorful and novel accessories. Their use will broaden, it is true, but the basic components of motor cars will continue to be metals—and principally ferrous metals—for years to come.

Next, take the case of the light metals, for which so many broad and unsubstantiated claims are being made. It must be granted that three years hence, aluminum and magnesium in cast, rolled and forged forms will be available in tremendous quantities, and in a price range which will make them distinctively competitive with iron and steel, if not pound for pound, then at least for volume. By this is meant that it may be possible to produce a part of an automobile in aluminum or magnesium that will have equal strength to one of iron or steel, and the cost will be a toss-up between the two groups of metals. The weight factor naturally will be easily in favor of aluminum or magnesium.

Ample new facilities will be available for forming, forging, casting, extruding, welding and otherwise fabricating the light metals. As such, they will not be of great value to automotive engineers, but at a price they can be adapted to automotive parts. Aluminum production capacity alone by December, 1943, will be over 1,000,000 tons annually, seven times the level of 1937.

In spite of these apparent advantages, it is this observer's opinion that iron and steel will continue to be the basic materials of motor car construction. The industry has had 40 years of experience in perfecting the use of iron and steel, and it will not throw aside four decades of "know-how" for the sake of a complete switch in material usage, the primary advantage of which, let us say, is reduction of weight.

Another thing, producers of ferrous metals will not sit idly by and watch competing materials make a play for their markets on a price basis. Before this happens they will sell at a loss.

The importance of weight reduction, and its consequent advantages in fuel economy, are being vastly over-rated in passenger car performance. It is a natural trend today, with all the emphasis on aircraft, where weight is a factor of primary importance. In passenger cars, economy is a strong talking point with sales forces, but it is seldom the clinching factor in a sale. Appearance, performance, comfort and price are what sell motor cars—not low weight and attendant economy. In weight, the trend actually has been toward increases rather than reductions, with addition of extra metal in fenders, hoods, bodies, etc.

The prospective buyer of a 5000-pound car, which will average 12 miles to the gallon of gasoline, is seldom moved to buying a 3000-pound car simply because he will be able to realize 16 miles to the gallon of gasoline. He buys the smart appearance, the solid feel, the luxury, the quick getaway of the big car, which looks swell parked along his neighbor's 5-year old 3000-pound jalopy. There is no reason to suppose automobile buying habits will come in for any major changes in the years immediately ahead. Changes, when they do come, are slow and evolutionary, seldom overnight. A memorable example is the old Chrysler Airflow model, supposedly years ahead of its design time, which never took hold with the buying public in any substantial way.

Auto Body Requires Heavy Metal

The argument may be advanced that the buyer of the 1942 model 5000-pound car will jump to buy a 3000-pound model if he can get at the same time equivalent appearance, size, comfort and performance. But it remains to be proved whether light metals can duplicate these primary selling points. There is plenty of question on the score of appearance, comfort and performance. No airplane yet produced can match the resplendent finish of the modern automobile body. As weight drops, roadability likewise often decreases and comfort suffers. Weight, too, appears to be a function of smooth, vibrationless performance. More than one motor company engineer

(*Please turn to Page* 155)

Die spring failure can be checked

Information supplied by an Industrial Publication

A recent investigation of die spring breakage developed the following prominent causes:

1. Hydrogen embrittlement resulting from plating, pickling or cleaning.
2. Incorrect die design.
3. Incorrect spring size.
4. Speed of compression cycle.
5. Poor quality of wire.

There are, fortunately, remedies for all these conditions. Hydrogen embrittlement can be corrected by heating plated springs to about 450°F. and air cooling.

Faults in die design usually consist of either insufficient or too great clearance between the outside diameter of the spring and the guide hole. The clearance should be such that the spring operates freely, but has no chance to buckle.

Care should be taken in selecting springs to see that they are properly designed for both length of compression stroke and speed of compression. If springs are repeatedly compressed too close to their solid height, quick failure will result. The same is true where the rapidity of compression is too great.

It seems obvious that the quality of the spring wire should be commensurate with the job. Cheap wire should be avoided because of defects that are bound to cause trouble, especially when springs are plated.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
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MOLY

WING TIPS

Girls and middle-aged women comprise 47 per cent of Boeing Aircraft's personnel. . . Outnumber men in many departments. . . Child care, safety, and training are troublesome problems

SEATTLE

STRIKING illustration of changed social and economic status of civilian working people in this war compared with wars of the past can be seen at the Seattle plants of Boeing Aircraft where in the space of only one year personnel has undergone a complete transformation and feminization. Figures tell the story. In April, 1942, women comprised only 3.7 per cent of the Boeing payroll. Today the percentage is 47 and going up. This is said to represent the highest proportion of any aircraft plant in the country.

Young girls out of high school and middle-aged matrons with high school children of their own—all have taken places alongside men in various departments. Many women have friends and relatives in the armed services and so have a personal interest in defeating the enemy. Some were attracted by the wages and pleasant working conditions. Patriotic motives induced others to do their bit in the hour of emergency.

During May, 1942, 1717 women were sent to Boeing plants by the United States Employment Service alone. At the end of that month women made up 7 per cent of the personnel. The increase has been rapid: June, 22 per cent; July, 25 per cent; August, 29 per cent; September, 26.5 per cent; October, 43 per cent; November, 45 per cent; February, 1943, 47 per cent plus.

There have always been women in aircraft plants. They were secretaries, typists, and clerks. But now in final assembly, where the chatter of rivet guns sounds like a war of its own, something new has been added. Look inside a fuselage jig where a Flying Fortress is taking shape and chances are that out of three workers two will be girls. You will find them climbing around tail wing jigs, too. It's hard to spot them at a glance because you won't find any skirts and high-heeled shoes. They wear slacks and shirts and their permanents are tied up in a handkerchief or a snood.

Women now do practically all types of work in Boeing plants. Chief limitations to employment of the gentler sex are the limitations of the individual. Officials say the most acceptable ages are from 18 to 42. Women in upper age brackets and women overweight are considered less satisfactory as a general rule because they find it hard to remain on their feet for a full shift.

In many departments women outnumber men. Thus, 94.8 per cent of all rivet buckers are women; 79.9 per cent of all beginning and probationary mechanics and 20.6 per cent of all riveters are women. Other shops with the high percentages of women include:

Upholstery shop, 75 per cent, making curtains, upholstery, sound proofing, etc.

Fabric cover shop, 74 per cent, making control surfaces—rudder, elevator, ailerons, all cloth covered.

Body minor shop, 70 per cent, fabricating the radio operator's compartment.

Electric wiring shop, 68 per cent, producing wiring harnesses.

Tubing shop, 66 per cent, where tubing for hydraulic and fuel systems is bent, cut, flanged or beaded.

Transportation, 66 per cent, scooters and car loaders, hauling through plant.

In an awkward position to do effective drilling, the girl at the left wears a corduroy work suit that meets Boeing's safety requirements

Right, Boeing punch press operator helps to speed the supply of parts to assembly lines

GEAR PRODUCTION *Shifts into High*

Photo by Office of War Information

SUNICUT

"permits up to 83% more tank gears cut per tool change"

Gears to drive America's steel "war horses" at break-neck speeds through sand, mud, and snow. That's the wartime job of a certain large eastern manufacturer producing gears for tanks . . . and he's doing a better job thanks in part to Sun Oil Engineers and Sunicut.

Early in the war effort this manufacturer decided his production rate had to be stepped up. He called a Sun Doctor of Industry—a metal working expert—who studied conditions and recommended a change in cutting lubricant. Sunicut, the transparent sulphurized cutting oil, was tested and adopted. Production soared! With Sunicut they are now able to cut as many as 83% more gears between tool changes.

Production increases like this are not uncommon when the exceptional metal-wetting and heat-absorbing qualities of Sunicut go to work on tough jobs. Whether you make gears or bullets or bomb fuses, if it's increased machine tool production you want, call in a Sun Doctor of Industry. His services and the products he offers are yours to use to turn out more and better war materials . . . faster. Write

SUN OIL COMPANY • ***Philadelphia***

Sun Oil Company, Ltd., Toronto and Montreal, Canada

SUNOCO

SUN PETROLEUM PRODUCTS *HELPING INDUSTRY HELP AMERICA*

Late in 1942, 86 per cent of all applicants for employment at the plants were women, indicating the relatively small number of men available and emphasizing the opportunities still open for large numbers of women. Special appeals are directed to young married women without children. The company stresses the point that working wives do not affect the selective service status of their husbands.

Child Care Is Problem

Various social agencies are endeavoring to solve the problem of caring for children of working mothers. Additional nursery facilities are planned. A representative of the Child Care Information Service found that one out of every sixteen women who applied for work had problems involving the care of children. Of women actually hired, 27 per cent had insecure plans for the care of their youngsters. Many women with children find it better to work the second shift from 3 to 11:30 p.m. or from 4 p.m. to 12:30 a.m. because it is easier to be away from their families at night. The gap between the time the mother leaves for her job and the father returns home often is filled by a neighbor who looks after the children.

Opinion is general on the Coast that the ultimate solution will be to have the older women in the neighborhoods, less able to engage in war work, care for the children, releasing younger women for pressing war jobs.

Replacing half of industry personnel with women presented many grave problems. New workers had to be trained after they had been recruited and had passed strict requirements of employment. In addition, practically the entire tooling system had to be redesigned along lines of simplified operating technique to meet new conditions.

It was a logical move to place the women in simpler tasks under direction of men foremen. As the women proved themselves adept and gained experience, many advanced to more responsible posts. Experience proved women can handle tedious jobs with more interest and less fatigue, in proportion, than men.

While women are not required to wear standard uniforms, officials have definite ideas regarding working apparel. They recommend a two-piece suit, "tuck-in" blouse style, with short sleeves, conservative colors and materials. Low or medium-heeled shoes must be worn with closed toes to prevent injury. Women also are requested to wear a hair net, snood or other means of preventing hair from being caught in tools and machinery. Other rules regarding apparel include one that prohibits the wearing of gloves and all visible jewelry.

While actual figures on safety are not available, since changed personnel took over, it is stated that in general while the accident rate in the aircraft industry is above the national industrial level, the Boeing rate has been reduced in recent months. Every precaution is taken to avoid mishaps and women obey rules designed to promote safety.

Back in the "make" shops where smaller parts of the Flying Fortress are formed and put together, women work at long benches and cut out sheet metal. They run the small, hand-operated drill presses and punch presses. They feed parts into the giant hydropresses. They work, too, on welded assemblies, in the paint shop, in the dope room, the protective finishing shop. Others are employed on spot welding machines, screw machines, saws and lathes.

Nimble Fingers Needed

Women have been found particularly adept in another department—driving lift trucks or "jitneys" through the plant. Mail deliveries are made on motor scooters operated by girl drivers.

One important job women have taken over is laying out on "forming boards" hundreds of wires making up the electrical system of the bomber. Instead of being installed one at a time in the plant, wires are arranged in approximately the shape they will take when they're in the ship. Operations call for a lot of patience and nimble fingers.

Not only in the shops but in several units of the engineering department as well women have taken jobs traditionally belonging to men. In this department are five girls listed as full-fledged engineers, each a college graduate in engineering or mathematics.

In flight and aerodynamics division, a

Few women have ever attempted to operate a Keller profiling machine, but this girl (bottom left) at Boeing seems at ease before the mechanical giant

Identified as a trainee by her armband, the middle-aged woman, below, is learning the intricacies of a heavy duty grinder

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half dozen girls operate Recordak machines recording on film flight data. College graduates in higher mathematics, they read figures and compute data recorded on test flights. Still another girl is an aerodynamicist with three years of aeronautical engineering at the University of Washington. Her job is analyzing wind tunnel data.

Another half dozen girls are expediters. They "chase parts" about the plant, read blueprints and in general help co-ordinate flow of production. Some of them stepped into the expediting department from desk jobs elsewhere in the organization by taking outside classes in blueprint reading and by learning the principles of Boeing's "production density" or multiple-line system of assembly.

Women share men's privileges at Boeing—even pay rate. A woman rivet bucker is entitled to the same pay as a man, providing both begin work at the same time. Wage raises and promotions come with experience and ability and their chances of advancement are as good as those of men.

Receive Vocational Training

How does a homeworker become a planemaker? It's simply a matter of training. Vocational schools are co-operating in a comprehensive program of training. Many women moved to Seattle from interior towns to take advantage of war-time opportunities. Most women received their training in periods from a week to 90 days through the Washington State Vocational Education system of the National Youth Administration. In Seattle there are two vocational schools as well as the NYA center. Training is available around the clock.

Converts Iron Foundry To Cast Steel Treads

Ingenious conversion of a part of General Motors' Saginaw Malleable Iron Division, Saginaw, Mich., to a steel foundry now producing cast steel tank treads was revealed last week by Saginaw officials. This broke one of the bottlenecks in the tank production program and still is of great importance in meeting tank schedules.

At the time of the Pearl Harbor attack, work was in progress to increase productive capacity of the plant. Because of the demand for materials of greater strength and ductility, it appeared that there would be a surplus capacity at the plant for cast iron products.

At the same time, a survey by Saginaw officials indicated there would be a tremendous demand for steel castings, particularly for tanks and other combat vehicles, and the decision was made to start producing steel castings. "Our decision to make steel was hedged by the provision that we would stick to the materials handling methods used successfully in making malleable iron and which we thoroughly understood," says James H. Smith, general manager.

Steel melting department at the Saginaw plant occupies 7800 square feet of floor space, and is equipped with two large and one small, acid cold-melt electric furnaces. Entire foundry layout is keyed to the idea of continuous, synchronized operations and as a basic factor in maintaining this continuity the furnaces are fired and tapped in rotation, thus delivering an uninterrupted supply of molten steel to the pouring section of the mold conveyor. In a 24-hour operation, approximately 250 tons of cast steel are melted.

Friction of dragging heavy loading trays in and out of heat treating furnaces at Ryan Aeronautical Co., San Diego, Calif., caused excessive deterioration of the trays, to overcome which a special type of loading fork operated by chain and crank was developed and built by Ryan engineers. In addition to reducing the wear on trays appreciably the loading fork cuts in half the time required to load and unload a furnace. Idea has been passed along to other aviation companies in the Aircraft War Production Council for use by them without charge.

Steel at General Motors' Saginaw Malleable Iron Division is poured into quarter-ton covered teapot ladles, left, which are carried by electric hoist on an L-shaped monorail loop. A moving pouring floor is synchronized with endless type plate mold conveyor, facilitating continuous and efficient pouring. At right is hydro-arc electric furnace being tapped into 5-ton bull ladle handled by overhead crane which transports molten steel from furnace to holding station

New York Iron Ores May Provide Additional Vanadium Supplies

IRON ore in New York may provide the country with an additional supply of vanadium as result of Bureau of Mines experiments showing that vanadium metal can be recovered from the ore under certain conditions, according to Dr. R. R. Sayers, director of the bureau.

An iron ore deposit on the east side of Lake Sanford in Essex county is being used in the production of ilmenite for the manufacture of paint pigment. Tailings (discarded material) from the ilmenite mill contain vanadium-bearing iron ore with high percentages of titanium oxide, a slag-forming substance which has made the ore difficult to use in blast furnaces, Dr. Sayers explained.

Because of the demand for vanadium for alloy steels, armor plate, and special tool steels, WPB requested the bureau, the University of Minnesota, and the National Lead Co., owner of the property, to investigate co-operatively the smelting methods for recovering vanadium from the tailings.

The vanadium-bearing material, after sintering, was fed to a 6-ton experimental blast furnace and an average of 87.3 per cent of the vanadium was recovered in the pig iron produced. By controlling the amount of titanium oxide in the slag of the furnace to about 10 per cent, the technicians operated the furnace without difficulty, they said, but when the titanium oxide content increased the furnace did not operate as satisfactorily. Vanadium from the blast furnace is locked in pig iron from which it can be removed by oxidation in a converter. The remaining pig iron can be utilized in making steel.

The Sanford Hill deposit is one of the largest beds of iron-bearing material east of the Lake Superior region and reportedly contains about 15,000,000 tons of ore. It is mined by open-pit methods.

Production of Magnesium From Dolomite Proposed

Bureau of Mines has developed a process whereby a 400,000,000-ton dolomite deposit near Las Vegas, Nev., in the Boulder Dam area, could be utilized to produce "many millions of tons" of magnesia which is a raw material of magnesium.

Bureau also disclosed that it has developed a new electrolytic process for turning magnesia into metallic magnesium.

Bureau engineers point out that the dolomite deposit, which is at Sloan, 19 miles southwest of Las Vegas, could be developed to serve the new plant of Basic Magnesium Inc., Royson, Nev., near Las Vegas. This plant, destined to be the largest in the country, now produces metallic magnesium from magnesia extracted from magnesite at its property in the Paradise Mountain range, Nye county, Nev. This magnesite must be treated in a $5,000,000 milling and calcining plant at Luning, Nev., and then transported more than 1000 miles by rail to the magnesium plant of Basic Magnesium Inc. at Royson, since there is no direct railroad connections between the main plant and Luning.

In seeking to eliminate the need for such a long haul, the bureau launched its experiments in the Sloan dolomite and also is conducting research on the possible utilization of low-grade magnesite deposits which are closer to the magnesium plant.

Search for New Reserves of Aluminum Ores Expanded

In a move developed jointly by the Bureau of Mines of the Department of the Interior and the War Production Board, the bureau today undertook the first steps for greatly expanding the search for additional reserves of domestic bauxite, alunite, and aluminous clays. The expanded search, to be conducted under a $500,000 Congressional appropriation bill recently signed by President Roosevelt, is designed to free the United States in the future from dependence upon imported bauxite for the aluminum for its war planes.

Exploratory crews now in the field already have increased in recent months the known reserves of bauxite by more than 6,000,000 tons, some of which is of a quality suitable for aluminum production, and the new appropriation will permit the bureau's drilling program to continue at a greatly expanded rate until June 30 of this year. The bureau has requested additional funds to carry the exploratory program through to June 30, 1944, explaining that there has been a ten-fold increase in the utilization of domestic bauxite and that the known national reserves of this ore are not sufficient to keep the United States supplied for a long war.

Integrating their work with that of the exploratory crews but operating under another appropriation, the bureau's chemists, metallurgists, and other highly-skilled technicians are speeding up their schedule in determining how the various alumina-bearing ores can be utilized most efficiently on a commercial scale. Seven laboratories and pilot plants have been assigned to this job.

Organize Mine Supply Service In Many Foreign Countries

G. J. Pateneaux, in charge of the Mine and Smelter Supply Service of the Board of Economic Warfare, Washington, has made considerable progress in organizing Mine Supply Control Districts in other countries on which we depend for imports of strategic minerals. Some 200 men already have been located at such key points as Lima, Mexico City, Coquimbo, Antafogasta, Oruro, Santiago, Buenos Aires and Rio de Janeiro. It is the responsibility of these men to keep in contact with the mine supply distributors in their districts and make sure that they have ordered and are obtaining deliveries of equipment and parts required to keep the mines in operation. These men also render other services, such as assisting mine operators to fill out requisitions and perform other paper work.

This priorities assistance is not at all restricted to Latin America but extends througout the world. Altogether the Board of Economic Warfare has obtained priorities serial numbers for more than 300 mines, located not only in Latin America but in the Belgian Congo, New Caledonia and Australia. Under existing policy, anywhere in the world, any mine operators, producing or capable of producing strategic minerals, can call upon the Board of Economic Warfare for assistance in obtaining needed equipment or parts.

Program To Stimulate Use of Carbon, NE Steels Extended

Arrangement started by WPB last year to stimulate use of plain carbon steel and the National Emergency alloy steels has been renewed for the second quarter of 1943.

Under this arrangement, sample quantities of steel for experimental purposes can be delivered to manufacturers or laboratories without regard to preference ratings or authorized controlled material orders. Such samples are shipped direct and may be taken from current mill production or from stock.

MEN of INDUSTRY

DR. EDGAR C. BAIN

FRED H. WEBB

H. G. HOGLUND

EMIL T. JOHNSON

Dr. Edgar C. Bain has been appointed vice president in charge of research and technology, Carnegie-Illinois Steel Corp., Pittsburgh. He joined the research staff of United States Steel Corp. in 1928 and since 1938 has been assistant to the vice president in charge of research and technology for United States Steel Corp. of Delaware. Dr. Bain has been active in technical societies, was president of American Society for Metals in 1937. He is associated with technical groups consulting with the armed services and the War Metallurgy Committee, among them the Ferrous Metallurgical Advisory Board of the Ordnance Department, United States Army.

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Fred H. Webb has been appointed district sales manager of Follansbee Steel Corp., with headquarters at 1299 Union Commerce building, Cleveland. Mr. Webb graduated from Yale University in 1921, and the past eight years was associated with the sales department of Youngstown Sheet & Tube Co., with offices in Cleveland. Mr. Webb succeeds the late Scott Follansbee.

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E. L. Zapp, formerly associated with Hyatt Bearings Division, General Motors Corp., and later with Henry Disston & Sons Inc., Tacony, Philadelphia, has joined Tube Reducing Corp., Wallington, N. J., in charge of metallurgical problems, with **R. Heinzerling** assisting.

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W. I. Worden has resigned as secretary-treasurer and a director, Gary Steel Supply Co., Chicago. **Henry B. Herring,** formerly head of the accounting department, has been named secretary and assistant treasurer and elected to the board. **Ross T. Adams,** vice president and a director, has assumed the additional duties of treasurer.

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James D. Moffat Jr., assistant to chief engineer, western region, Pennsylvania railroad, Chicago, has been promoted to chief engineer, succeeding **I. W. Geer,** retired. **George W. Patterson,** assistant engineer, has been advanced to assistant to chief engineer.

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Helge G. Hoglund, the past ten years sales manager, Machine Tool Division, Van Norman Machine Tool Co., Springfield, Mass., has been promoted to vice president. He will continue to be in charge of sales of the Machine Tool Division, and in addition, will have control of sales of the new Electronics Division which is manufacturing induction heating equipment.

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Frank S. O'Neil, general manager of the Link Belt Co.'s Indianapolis operations, has been promoted to position of vice president. He succeeds **James S. Watson,** vice president, Indianapolis, who plans to retire at the end of the year. Mr. O'Neil joined the company at the Pershing road plant in Chicago. His headquarters will continue to be 220 South Belmont avenue, Indianapolis.

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F. J. Urquhart has become regional manager of the South Bend, Ind., branch of Studebaker Corp. Before his transfer to South Bend a year ago he was district sales manager in the Chicago office.

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George R. Atkins has been named manager of the Akron, O., branch sales office and factory of Bristol Co., Waterbury, Conn. He joined the company's Pittsburgh district sales engineering staff in 1935, and a year later became resident sales manager in Greenville, S. C. He returned to Pittsburgh a short time ago.

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Joseph C. O'Rourke has been appointed acting district chief, Materials Redistribution Division, WPB, Buffalo. He will supervise in eight western New York counties all frozen and idle inventories of critical war materials, arranging with industry to sell voluntarily at market prices to other war producers.

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Emil T. Johnson, formerly works manager, has been promoted to plant manager, Lycoming Division of Aviation Corp., Williamsport, Pa. He has been associated with Lycoming since October, 1941, as master mechanic, plant superintendent and works manager. He is succeeded in the latter post by **Herbert J. Glasby,** formerly factory manager of the Oakes Products Division of Houdaille Hershey Corp., North Chicago, Ill.

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Dave L. Riley, the past seven years associated with Greenlee Bros. & Co., Rockford, Ill., has joined Hughes Tool Co., Houston, Tex., as technical adviser. During the past two years Mr. Riley was loaned to the Studebaker Corp. as assistant to vice president in charge of manufacturing, and in turn was loaned to the Tools Branch of WPB as a technical adviser and to the Army Air Forces and Wright Aeronautical Corp. on special assignments.

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Nathaniel C. Fick, heretofore metallurgist at the Gary plant of Carnegie-Illinois Steel Corp., has joined the research staff of Battelle Memorial Institute, Columbus, O., and has been assigned to its division of metallurgical research.

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Frank J. Hannon, vice president, Murray Ohio Mfg. Co., Cleveland, has been elected a director of the company.

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John L. Brown Jr. has been appointed factory manager, Sikorsky Aircraft Division of United Aircraft Corp., Stratford, Conn. Mr. Brown has been associated with the company since 1928, having started in the Pratt & Whitney Division at East Hartford. Later he was transferred to the Hamilton Standard

Propellers Division, becoming assistant factory manager of that division in 1939.

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Francis J. Trecker has been appointed secretary of the Kearney & Trecker Corp., Milwaukee, manufacturer of machine tools. He is a graduate of Cornell University with degrees in both administrative and mechanical engineering. He joined the corporation in 1939 as a sales engineer and in 1940 was placed in charge of the subcontracting program.

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Howard Jones, works manager, White Motor Co., Cleveland, has been promoted to vice president in charge of production. **Roy Denham,** production manager of the engine and axle division, succeeds Mr. Jones as works manager.

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Robert K. Kulp has been appointed director of research, Jessop Steel Co., Washington, Pa. He was formerly associated with the Steel and Tube division, Timken Roller Bearing Co. and Lukens Steel Co. He entered the steel industry as a student engineer with the American Steel & Wire Co. in 1929. His headquarters will be at the main office, Washington, Pa.

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Arnold "Jigger" Statz returned from 24 years of baseball stardom to become personnel counselor of the Plomb Tool Co., Los Angeles.

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John Rosevear has been appointed manager of the new Fairmont, W. Va., Works of the Westinghouse Lamp Division, Bloomfield, N. J. He will co-ordinate manufacturing activities of the fluorescent plant, an electronic tube plant, and a new glass factory under construction. He joined Westinghouse as an electrical draftsman in 1922.

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C. J. Bickler has been appointed assistant to the vice president, sales, Globe Steel Tubes Co., Milwaukee. He was formerly sales manager of the Cleveland district.

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C. H. Weaver has been appointed manager of the Marine Section, Westinghouse Electric & Mfg. Co., Pittsburgh. He joined the company in 1936 shortly after graduating from the University of Pennsylvania with a degree in electrical engineering.

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J. Roger White, associated with Formica Insulating Co., Cincinnati, since 1928, the past three years as general sales and advertising manager, has been elected vice president in charge of sales and advertising. **George H. Clark,** with the company 18 years, has become vice president in charge of engineering; **R. W. Lytle** has been made vice president in charge of special engineering in charge of automotive and aircraft engineering; **Ellsworth G. Williams,** vice president in charge of manufacturing; **W. J. Gebhart,** with the company 20 years, and treasurer since 1936, has been elected vice president in charge of finances and accounting and a director.

F. J. TRECKER

ROBERT K. KULP

JOHN ROSEVEAR

Walter H. Kruse, since 1936 assistant secretary, has become secretary. **Harry Grunewald,** assistant production manager, has been named factory manager. Other officers and directors have been re-elected.

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Charles E. Brinley was elected to the newly created office of chairman of the board, Baldwin Locomotive Works, Philadelphia. He served as president of the company since January, 1939. **Ralph Kelly** succeeds him as president.

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Fred A. McDonald, commercial agent since 1923, Rock Island and Pacific railroad, Alexandria, La., has been appointed assistant to the freight traffic manager, Chicago.

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William R. Odell Jr., treasurer, International Harvester Co., Chicago, until August, 1942, when he joined the staff of the Chicago Ordnance District, has been named chief of the price adjustment section of the district. He succeeds **Glen A. Lloyd,** who has been called to Washington to become assistant director for price, War Department.

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Leston P. Faneuf has been made assistant to **Lawrence D. Bell,** president and general manager, Bell Aircraft Corp., Buffalo. Formerly assistant vice president of the Marine Midland Group Inc., Mr. Faneuf will study personnel problems.

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Leighton W. Rogers, former president, Aeronautical Chamber of Commerce, and former vice president, Bellanca Aircraft Corp., has been appointed special representative of the Bell Aircraft Corp. on its products in service.

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Kenneth W. Cole, manager of the Chicago office, Pressed Steel Tank Co., Milwaukee, has been granted a leave of absence to accept an appointment in the Containers Division, WPB, in Washington.

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Alfred P. Sloan Jr., chairman of the board of General Motors Corp., has been named chairman of the National Industrial Information Committee. He succeeds **J. Howard Pew,** president, Sun Oil Co., Philadelphia.

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C. R. Ince, chief of the co-ordination section, Conservation Division, WPB, has returned from a six-week trip to England where he set up a conservation section under the Harriman mission. Purpose of the section is to co-ordinate

British and American conservation practices. Mr. Ince is assistant sales manager, St. Joseph Lead Co., New York.

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Martin Davis has been appointed assistant advertising manager, Perfect Circle Co., Hagerstown, Ind., replacing **John Senn,** who has joined the Army. The past 13 years Mr. Davis has been associated with the Blaker Advertising Agency, New York.

G. O. Bucklin and **Robert M. Doxey** have been made district managers of Perfect Circle. Mr. Bucklin, formerly with Electric Auto-Lite Co., has been assigned to the northern Ohio district, with headquarters in Cleveland. He succeeds **Jack Boddie,** resigned. Mr. Doxey, heretofore associated with Superior Parts Co., Pittsburgh, will cover upper New York area and will make Buffalo his headquarters. **Ken Sloane,** who has worked out of Buffalo the past two years, will take over the metropolitan New York district, with headquarters in New York City.

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William H. Shipman, of Louisville, Ky., has been appointed factory manager, Bendix-Westinghouse Automotive Air-brake Co., Elyria, O.

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W. S. Richardson, general manager, Industrial Products Sales Division of B. F. Goodrich Co., Akron, O., announces the following appointments: **Chester F. Conner,** merchandise manager; **Jay E. Miller,** sales promotion manager; **Harold F. Mosher,** manager, special industrial merchandise.

Grover D. Motherwell has been appointed manager of the Minneapolis district of B. F. Goodrich, succeeding the late Arthur J. Martin. Associated with the company since 1928, he has held a number of executive sales posts at Chicago, the last being that of sales supervisor.

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H. L. Trembicki has been appointed manager of the newly organized Wire Coating Division of Magnus Chemical Co. Inc., Garwood, N. J. Mr. Trembicki has had a wide range of experience in the metalworking and wire drawing industries.

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John W. Hacker has been appointed general superintendent of the Christy Park Works of National Tube Co., McKeesport, Pa., succeeding the late Walter T. Mahla. Mr. Hacker joined National Tube in April, 1940, as industrial engineer at its National Works, McKeesport, and in March, 1942, became chief industrial engineer of the company with offices in Pittsburgh.

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J. S. Clapper, the past 29 years president, Toro Mfg. Corp., Minneapolis, has become chairman of the board. **H. Clay McCartney,** formerly secretary and treasurer, has been elected president. **Kenneth E. Goit,** sales manager, has been made secretary

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W. W. Coleman, heretofore president, Bucyrus-Erie Co., Milwaukee, has been elected chairman of the board, and **G. A. Morison,** formerly a vice president, has become vice chairman of the board. **N. R. Knox,** vice president, succeeds Mr. Coleman as president. **W. L. Litle,** of Erie, Pa., has been elected a vice president, and **W. M. Bager,** technical director.

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Daniel Lewis has resigned from active direction of the roll department of Continental Roll & Steel Foundry Co., East Chicago, Ind., but will continue as a consultant. He has been succeeded by **William E. Cadman,** as manager of roll sales, and **Arthur E. Murton,** as roll manager. Mr. Lewis has been associated with Continental since 1927 and has been active in the industry since his high school days when he worked in the laboratory of the Lorain Steel Co., Lorain, O.

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Keith Powlison, formerly treasurer, Armstrong Cork Co., Lancaster, Pa., has been elected vice president and controller, succeeding **George M. Arisman,** resigned. **M. J. Warnock** has become treasurer and will be succeeded as director of advertising and promotion by **Cameron Hawley.**

OBITUARIES...

Gustave J. Melms, 81, consulting engineer, Allis-Chalmers Mfg. Co., Milwaukee, at Paris, until retirement in 1932, died April 3 in Switzerland, where he had resided since the war. A pioneering expert in steam turbine and electric locomotive construction, Mr. Melms was once with Thomson-Houston Co., Lynn, Mass., now part of General Electric Co. In 1905 he perfected a steam turbine system and formed his own company abroad. He built numerous power plants, including the municipal plant at Frankfort, Germany. Mr. Melms was a graduate of Worcester Polytechnic Institute in 1884.

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William F. Williams, 74, treasurer, Dittmer Gear & Mfg. Co., Lockport, N. Y., died at his home there March 31.

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Harry Herbert De Loss, a director of Handy & Harman, New York, died March 28, at Clearwater, Fla. Joining the organization in 1900, Mr. De Loss served as vice president in charge of manufacturing for many years; was treasurer from 1905 to 1915, vice president from 1915 to 1923, and a director from 1905 until his death.

Percival J. Myall, 63, sales manager, Fisher Furnace Co. Inc., Chicago, died April 4 at his home in Glenview, Ill.

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Joseph F. Cooley, 62, vice president and general manager, Hartford Machine Screw Co., Hartford, Conn., died in that city, recently.

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Francis X. Dalton, 56, purchasing agent, LaPointe Machine Tool Co., Hudson, Mass., died recently.

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George Allison, 64, died at his home in Milwaukee, March 30. Mr. Allison was general comptroller of Falk Corp. and vice president and director of Baltimore Dry Dock & Shipbuilding Co. before he retired in 1928.

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William Russell Grace, 64, first vice president and director, Ingersoll-Rand Co., New York, and a director of W. R. Grace & Co., that city, died at his home in Aiken, S. C., March 31. Mr. Grace was also a director of various subsidiaries of Ingersoll-Rand. He had been associated with the company and its predecessor many years.

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Harry C. Weiskittel, president, Harry C. Weiskittel Co. Inc., Baltimore, died at his home in that city, recently. He had been identified with the foundry industry many years and before establishing his own firm a decade or so ago, was associated with his father and brother in the firm of A. Weiskittel & Sons Co., Baltimore.

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Edward A. Pridmore, 61, president, International Molding Machine Co., Chicago, died March 29, in that city. For 45 years he was internationally known as a designer and builder of foundry molding machinery.

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William Whitney, 84, purchasing agent, Berwind-White Coal Mining Co., Philadelphia, died recently in that city. He had been in charge of purchases for many years.

War Expansion Program Fourth Largest Among United Nations

TORONTO, ONT.

SINCE the beginning of 1940 the Canadian government, through the Department of Munitions and Supply and its predecessors, has created production facilities for war materials to a total of $800,000,000 and has incorporated 23 Crown companies. It has attained fourth place among the United Nations as a producer of war supplies

Fixed capital commitments by the Canadian and British governments are divided as follows: Ammunition, 17.3 per cent; chemicals and explosives, 21.2 per cent; guns, mountings and carriages, 22.6 per cent; machine tools, instruments, etc., 2.5 per cent; mechanical transport, 1.1 per cent; raw materials, not end products, and miscellaneous stores, 17.1 per cent; tanks and carriers, 3 per cent; aircraft, 11.6 per cent; shipbuilding and ship repairs, 3.6 per cent. In addition the government has provided large sums for working capital for these projects. The larger portion has been expended and the plants are in operation.

Since outbreak of the war contracts placed on Canadian, United Kingdom and other accounts, excluding certain contracts yet to be placed under the plant extension program, to the end of 1942, total $6,542,902,324. Of this total $3,289,305,275 was on Canadian account, $2,711,764,280 for United Kingdom account. Other contracts amounted to $496,217,278 and contracts for civilian aviation and the air training plan were valued at $45,514,837. In the three-year period 468,200 individual contracts were placed.

Early this year a new peak was reached in war materials production, about the maximum that can be attained, with annual rated capacity of $3,700,000,000. Little further industrial plant expansion is expected this year although several plants still are under construction. At the end of 1942 more than 4000 Canadian plants were producing war needs, industrial capacity had been increased by $1,000,000,000 and workers engaged in war efforts numbered 1,000,000.

Increased production of steel is inadequate to meet needs and much is imported from the United States and close co-ordination with that country has been reached through the joint War Production Board.

The National War Labor Board has ruled that a basic rate of pay of 50 cents per hour, with a cost-of-living bonus of 9 cents per hour, has been established for employes of Algoma Steel Corp. Ltd., Sault Ste. Marie, Ont., and Dominion Steel & Coal Corp. Ltd., Sydney, N. S. This makes minimum earnings of these workers 4 cents per hour higher than the 55 cents established in the terms of settlement of the steel strike in January.

The board also ruled that regardless of any downward revision in the cost-of-living bonus the minimum rate plus the bonus is not to fall below 55 cents per hour for the duration of the war. The new rates are effective from the first pay period starting March 23.

G. C. Bateman, metals controller, has issued a new order, No. MC 28a, specifying composition of tin-containing non-ferrous ingots made for production of castings for steam fittings, bearings and bushings and plumbing supplies.

Dionnes To Help

The Dionne quintuplets, who will sponsor five new coastal cargo vessels to be launched early in May at the Walter Butler Shipyard, Superior, Wis., will participate in what will be one of the greatest mass launchings in the history of Great Lakes shipbuilding.

Each of the quintuplets will sponsor a new coastal vessel built under Maritime Commission contract. Water from Niagara Falls, symbolizing the unarmed boundary and the long friendship existing between Canada and the United States, will be used in the ceremony.

Announcement the world-famous children would leave their native Canada was made three weeks ago in the Ontario parliament. The ships later will be turned over to the British under the terms of the lend-lease act.

NEW FACILITIES . . .

Contracts Authorized for War Plants, Equipment

New war plant facilities and equipment purchases were authorized last week for eight contractors by the Defense Plant Corp. DPC will retain title to the facilities which will be operated by the contractors Figures are approximate. Contracts include:

Western Fluorspar Corp., Cheyenne, Wyo., to provide power plant facilities in Colorado, $90,000.

Owens-Corning Fiberglas Corp., Toledo, O., to provide plant facilities in Pennsylvania, $1,600,000.

American Zinc, Lead & Smelting Co., St. Louis, to provide plant facilities in Washington, $80,000.

Bower Roller Bearing Co., Detroit, to provide additional equipment for a plant in Michigan at a cost of $460,000, resulting in an overall commitment of $1,030,000.

W. F. & John Barnes Co., Rockford, Ill., to provide additional plant facilities in Illinois at a cost of $300,000, resulting in an overall commitment of $3,200,000.

Lombard Iron Works Co., Augusta, Ga., to provide additional equipment for a plant in Georgia at a cost of $41,000, resulting in an overall commitment of $130,000.

Revere Copper & Brass Inc., New York, to provide additional plant facilities in New York at a cost of $125,000, resulting in an overall commitment of $835,000.

Portage Machine Co., Akron, O., to provide additional equipment for a plant in Ohio at a cost of $36,000 resulting in an overall commitment of $180,000.

General Cable Corp., New York, to provide additional facilities, for a plant in Missouri at a cost of $40,000, resulting in an overall commitment of $4,300,000.

Shofner Iron & Steel Works, Portland, Oreg., to provide additional plant facilities in Oregon at a cost of $42,000 resulting in an overall commitment of $246,000.

Army Offers $200,000,000 Orders To Small Plants

Army Quartermaster Corps, Army Service Forces, has offered $200,000,000 in immediate orders to the Smaller War Plants Corp., which will recommend industries capable of producing the needed items.

Items included among those listed for immediate procurement are pistol belts, pack carriers, shoes, wool blankets, small trailers and hand trucks, overcoats, water buckets, leather mittens, and 11,000;000 yards of fabrics, including cotton and wool cloth for uniforms.

Car Ferries To Haul Trucks to Cleveland

Car ferries CITY OF PETOSKY and CITY OF MUNISING are being fitted for a new service handling auto trucks and trailers between Cleveland and Detroit. The two 356-foot Michigan-owned vessels have been chartered to Trucker Steamship Co., Detroit.

Water shipment of the vehicles, it is estimated, will save 5,000,000 tire miles and large quantities of gasoline and oil.

Seven government flags fly from the flagpole at General Electric Co.'s Erie, Pa., works. At left, six Stefanowicz sisters, all employed at the plant, hold the various flags while the Treasury's "Minute Man" pennant hangs on the wall. Left to right, the sisters are, front row: Sadie, 19, the Navy "E"; Edna, 21, the Army-Navy "E"; Josephine, 23, the Victory Fleet. Second row: Anna, 27, Bureau of Ordnance flag; Stella, 29, the Navy "E"; and Helen, 25, the Maritime "M"

Robert Colaizzi, employe of the Mathews Conveyer Co., Ellwood City, Pa., acknowledges receipt of Army-Navy "E" pin from Commander W. W. Slocum, U. S. N. R. Melda Roof, representing women employes, stands by

Maj. Harold G. Garvis, chief, tank branch, Pittsburgh Ordnance District, presents pennant to Ingram-Richardson Mfg. Co. at Beaver Falls, Pa.

Army-Navy "E" awarded East Pittsburgh division of Westinghouse Electric & Mfg. Co. is accepted by A. C. Streamer, vice president, on behalf of plant's 27,753 employes. During February, the plant shipped 1437 carloads of finished war material

Metalworking Companies Honored for Production

Metalworking companies designated to receive the joint Army-Navy award last week include:

Allis-Chalmers Mfg. Co., supercharger plant, Milwaukee.
American Gear & Mfg. Co., Chicago.
American Hydraulics Inc., Sheboygan, Wis.
American Screw Machine Products Inc., Chicago.
Bernhardt Mfg. Co., Charlotte, N. C.
Cincinnati Planer Co., Cincinnati.
General Ceramics & Steatite Corp., Keasbey, N. J.
B. F. Goodrich Co., Clarksville, Tenn.
Henry Heide Inc., New York.
Hughes-Keenan Co., Mansfield, O.
Ben Hur Mfg. Co., Milwaukee.
William F. Jobbins Inc., Aurora, Ill.
Lehigh Foundries Inc., Easton, Pa.
Louisville Tin & Stove Co., Louisville, Ky.
Merchant & Evans Co., Lancaster, Pa.
Monsanto Chemical Co., Longhorn Ordnance Works, Marshall, Tex.
National Union Radio Corp., Newark, N. J.
Reynolds Research Corp., Louisville, Ky.
Rust Proofing & Metal Finishing Co., Cambridge, Mass.
Spencer Thermostat Co., Attleboro, Mass.
Stearns Mfg. Co., Adrian, Mich.
Thresher Varnish Co., Pittsburgh Plate Glass Co., Dayton, O.
Trojan Powder Co., Plum Brook Ordnance Works, Sandusky, O.
United Steel & Wire Co., Battle Creek, Mich.

Absenteeism Factor in Army-Navy "E" Awards

To discourage absenteeism among war workers, the Navy Department warns that Army-Navy "E" production awards will be withheld from organizations failing to show a good employe-attendance record.

Excessive absenteeism among organizations producing war materials will disqualify them in securing the "E" award or a renewal of it.

Kaiser Shipyard Receives "Gold Eagle" Citation

Maritime Commission's Golden Eagle Merit Award, emblematic of "unprecedented performance" in the shipbuilding industry, has been presented to Henry J. Kaiser's Oregon Shipbuilding Corp., Portland, Oreg.

The company was the first to receive the "M" pennant a year ago, and since then has received ten stars.

Three ship repair yards and seven industrial plants, manufacturing parts and equipment for the ships of the Victory Fleet, have been designated to receive the Maritime Commission's "M" pennant for meritorious production.

Of the more than 1500 industrial organizations engaged in furnishing parts and materials for the new ships, only 77 plants have been designated to receive the "M". In addition to industrial organizations, the awards are also given to shipyards. A grand total of 95 pennants have been given to yards and plants since the inception of the awards in April one year ago.

Repair yards to receive the award are the Todd-Erie Basin Drydock Co., at Brooklyn, N. Y., Bethlehem Steel Co., Brooklyn and Hoboken, N. J.

Industrial plants cited are: Beaumont Iron Works, Beaumont, Tex., castings and various fittings; Goldens' Foundry & Machine Co., Columbus, Ga., power transmission machinery; Nordberg Mfg. Co., Milwaukee, engines; William Powell Co., Cincinnati, valves; Scott Graff Co., Duluth, Minn., lumber and millwork; Washington Iron Works, Seattle, lathes and cranes.

Foote Bros. Gear & Machine Corp., Chicago, receives "E". At ceremony, are, left to right: Rear Admiral Clark H. Woodward; Joseph D. Persily, president, United Electrical Radio and Machine Workers, local 1114; Frances H. Klinck, Rose N. Oaf and Henry E. Soderling, Foote employes; William A. Barr, company president; Col. William H. McCarty

U. S. Automatic Corp., Amherst, O., manufacturer of screw machine products, receives the pennant for excellence in production. Above are shown company officials and service officers participating in the ceremony

Record Sales, Production Bring Steel Lower Net

Increased wage costs, taxes result in decreased return. Surplus accounts grow as producers make provision for postwar adjustment . . . 1942 taxes equivalent to $22.21 per common share

RECORD production and peak sales volume in 1942 brought the steel industry a lower net income than was realized in either of the two preceding years.

Greatly increased taxes and wage costs, combined with fixed prices, more than offset the increase in sales. Severe strain on facilities caused by forced operations also resulted in higher maintenance and replacement costs.

Net sales reported by 20 steel producers in the accompanying table aggregated $3,644,209,069 in 1942, a gain of 24.1 per cent over the $2,937,306,593 reported by the same group in 1941. In contrast with the gain in sales, net income for the 20 companies fell 28.4 per cent from $159,815,994 in 1941 to $114,382,593 last year.

Of those companies reporting net sales Bethlehem Steel Corp. had the largest volume, totaling $1,511,672,299 against $961,240,737 in the preceding year. Republic Steel Corp.'s sales volume amounted to $517,892,134 in contrast with $480,542,106 in 1941. Seven of the companies reporting, however, failed to show an increase in net sales volume for the year.

Net profit margin for the 20 companies reporting a net sales figure declined to 3.14 per cent last year from 5.44 for the identical companies in 1941. For substantially the same group the net return on sales in 1940 was 7.48 per cent and 5.69 during 1939.

Net Per Common Share $4.55

Net income per common share reported by the companies in the table amounted to $4.55 a share on 31,825,684 shares. This compares with $7.44 on 31,533,806 shares in 1941. Trend in net income per common share for substantially the same group of companies during 1940, 1939, 1938 and 1937 was $6.11, $2.43, deficit of $1.72 and profit of $4.92 respectively.

Nineteen of the companies paid dividends on common stock in 1942. Of these, nine producers' payments were lower than in 1941, four paid the same amount and six raised the payment. Two producers increased payments on their preferred stock, while one reduced disbursement.

No definite policy has yet been established for the industry under contract renegotiation procedures currently being discussed. While recognizing the principle of eliminating excessive profits from the war, industry officials feel that the amount realized from 1942 operations is not excessive.

Tax provisions for 1942 made by the 22 companies rose 34.8 per cent to a total of $706,731,737 from $524,136,611 in the preceding year. For substantially the same group, tax provisions in 1940 and 1939 amounted to $208,594,514 and $135,267,280 respectively.

Taxes last year for this group represented $22.21 per common share, against $16.62 in 1941; while in 1940 and 1939 it amounted to $6 and $3.98 per share respectively.

United States Steel Corp.'s tax bill last year rose $36,498,484 to $228,001,058; Bethlehem's $77,293,019 to $185,704,093; while Republic Steel Corp.'s tax provision amounted to $77,623,997, an increase of $20,396,375.

Reduction of funded debt to $670,907,328, 13 per cent below that of the preceding year, and substantial additions to reserves for contingencies indicate a deepening interest in postwar adjustments. All but two of the producers reported an increase in the surplus account. For the group of 22 companies the aggregate surplus was nearly $52,000,000 above the 1941 total.

Total capitalization for the companies declined slightly to $3,840,152,975 from $3,873,572,482 in the preceding year, due primarily to the reduction in funded debt. Common stock valuation was up $9,817,720 for the latest period, while value of preferred shares rose $141,400.

Total income before dividends and interest on bonds was $218,225,400 last year, against $304,846,259 in 1941. During the past year the 22 companies had a return of total income on capitalization of 5.68 per cent, compared with 7.87 per cent in the preceding year. In 1938, 1939 and 1940, total income on capitalization was 0.59, 4.27 and 7.57 per cent respectively.

Current liabilities for the group aggregated $975,416,353 at the close of 1942, compared with $700,226,064 in the preceding year or a gain of 39.3 per cent. Current assets advanced moderately to $2,263,902,545 during the latest period. Net quick assets of $1,288,486,192 were 4.2 per cent above the comparable 1941 figure. Total assets in 1942 were placed at $5,115,415,163, up moderately from the $4,819,810,601 reported by the same companies for 1941.

STEEL acknowledges with appreciation the co-operation of all companies which supplied data for the accompanying tabulation. Additional copies may be obtained from Readers' Service Department, STEEL.

Cleveland-Cliffs Iron Income Slightly Lower

Cleveland-Cliffs Iron Co., Cleveland, reported net profit last year as $4,057,235, compared with $4,149,512 in 1941. Net earnings in the latest period are equivalent to $8.33 a share on company's $5 cumulative preferred stock, on which unpaid dividends at the close of the year amounted to $27.16, against $8.52 on the preferred stock in prior year.

Acme Steel Earnings Equal $5.43 per Share

Acme Steel Co., Chicago, in 1942 earned net profit of $1,782,921, after provision of $360,068 for contingencies, equal to $5.43 a share. This contrasts with 1941 net of $2,994,240, or $9.13 a share. Federal and Canadian income and excess profits taxes amounted to $4,066,474, after deducting $360,068 postwar refund. In 1941 taxes totaled $5,296,291.

Midland Steel Products 1942 Return Decreases

Net income before taxes of Midland Steel Products Co., Cleveland, last year amounted to $4,478,347 as compared with $3,615,635 for 1941. Accruals of federal taxes on income increased from $1,714,471 to $3,070,763 in 1942, reducing net after all charges from $1,901,213 reported in prior year to $1,407,583. The company's 1942 tax burden equalled $13.07 for each outstanding share of common stock.

Financial Analysis o

Official Returns from Twenty-Two Pro

	No. Shares Common Stock Outstanding		Common Stock Valuation		Preferred Stock Valuation		Funded Debt		
	1942	1941	1942	1941	1942	1941	1942	1941	
United States Steel Corp.	8,703,252	8,703,252	$652,743,900	$652,743,900	$360,281,100	$360,281,100	$139,694,841	$181,238,442	$4
Bethlehem Steel Corp.	2,984,994	2,984,994	283,574,430	283,574,430	93,388,700	93,388,700	162,171,365	181,778,095	1
Republic Steel Corp.	5,669,922	5,670,628	130,309,141	130,309,141	33,325,800	33,958,950	78,806,350	95,224,569	
National Steel Corp.	2,205,667	2,205,667	55,001,800	54,866,675	None	None	57,865,464	60,931,348	1
Inland Steel Co.	1,633,105	1,633,105	60,979,309	60,979,309	None	None	37,360,000	46,680,000	
Jones & Laughlin Steel Corp.	1,602,467	1,311,161	67,372,900††	57,662,700††	58,682,900††	58,682,900††	47,922,882	40,375,000	
Youngstown Sheet & Tube Co.	1,675,008	1,675,008	105,088,053	105,088,053	15,000,000	15,000,000	68,636,082	74,796,352	
Wheeling Steel Corp.	569,559	569,674	28,477,950	28,483,700	36,316,600	36,316,600	33,600,000	34,800,000	
Pittsburgh Steel Co.	508,917	508,917	4,862,190	4,862,190	16,227,020	15,771,300	8,220,864	8,380,000	
Crucible Steel Co. of America	444,698	445,198	11,117,443	11,129,943	32,702,615	32,932,000	13,892,000	15,700,000	
Allegheny Ludlum Steel Corp.	1,257,809	1,256,251	7,861,306	7,872,269	2,838,800	2,838,800	None	None	
Sharon Steel Corp.	392,331	392,331	3,974,530	3,974,530	5,972,000	5,972,000	900,000	1,600,000	
Wickwire Spencer Steel Co.	459,316	459,316	4,593,164	4,593,164	None	None	1,250,000	1,714,702	
Rustless Iron & Steel Corp.	926,547	926,212	926,547	924,939	1,825,600	1,189,088	2,050,000	2,400,000	
Keystone Steel & Wire Co.	757,632	757,632	3,156,800	3,156,800	None	None	None	600,000	
Granite City Steel Co.	382,488	382,488	8,483,821	8,483,821	None	None	2,670,639	3,128,777	
Lukens Steel Co.*†	317,976	317,976	3,179,760	3,179,760	None	None	2,200,000	3,212,700	
Continental Steel Corp.	200,561	200,561	5,276,243	5,276,243	1,765,632	1,853,929	1,200,000	1,400,000	
Alan Wood Steel Co.	200,000	200,000	4,388,889	4,388,889	7,186,133	7,186,133	None	None	
Laclede Steel Co.	206,250	206,250	4,125,000	4,125,000	None	None	750,000	750,000	
Northwestern Steel & Wire Co.	163,565	163,565	817,825	817,825	75,000	75,000	681,641	798,203	
Colorado Fuel & Iron Corp.‡	563,620	563,620	5,636,200	5,636,200	None	None	11,035,200	15,518,200	
Total (or average)	31,825,684	31,533,806	$1,451,947,201	$1,442,129,481	$665,587,900	$665,446,500	$670,907,328	$771,026,388	$1,0

	Net Income Before Dividends		Preferred Stock Dividend Requirements		Dividends Paid Per Share on Preferred		Income Per Common Share		Dividends Paid Per Share on Common	
	1942	1941	1942	1941	1942	1941	1942	1941	1942	1941
United States Steel Corp.	$71,818,569	$116,171,075	$25,219,677	$25,219,677	$7.00	$7.00	$5.35	$10.45	$4.00	$4.00
Bethlehem Steel Corp.	25,387,760	34,457,796	6,537,209	6,537,209	7.00	7.00	6.31	9.35	6.00	6.00
Republic Steel Corp.	17,154,578	24,038,340	2,017,580	2,072,808	6.00†*	6.00†*	2.67	3.87	1.25	2.00
National Steel Corp.	11,929,867	17,102,350	None	None	None	None	5.41	7.75	3.00	3.25
Inland Steel Co.	10,721,372	14,821,353	None	None	None	None	6.57	9.08	4.50	5.00
Jones & Laughlin Steel Corp.	10,141,690	15,499,983	2,934,095	2,696,005	5.00	3.50	4.50	9.77	2.50**	2.60
Youngstown Sheet & Tube Co.	10,305,706	16,124,401	825,000	825,000	5.50	5.50	5.66	9.13	2.50	3.00
Wheeling Steel Corp.	4,441,964	8,506,304	1,815,830	1,837,064	5.00	5.00	4.61	11.71	1.50	2.00
Pittsburgh Steel Co.	2,488,074	3,169,598	862,939	860,660	13.75†	2.75†	3.19	4.54	None	None
Crucible Steel Co. of America	4,864,781	7,439,480	1,635,100	1,671,600	5.00	5.00	7.26	12.96	2.00	1.00
Allegheny Ludlum Steel Corp.	4,861,484	5,062,709	198,716	216,349	7.00	7.00	3.71	3.86	2.00	2.25
Sharon Steel Corp.	1,383,065	1,633,364	298,600	298,600	5.00	5.00	2.76	3.40	1.00	1.00
Wickwire Spencer Steel Co.	1,599,004	1,578,463	None	None	None	None	3.48	3.44	1.00	0.50
Rustless Iron & Steel Corp.	2,644,557	2,334,627	91,280	91,280	2.50	2.50	2.76	2.42	0.75	0.60
Keystone Steel & Wire Co.	1,758,942	1,815,413	None	None	None	None	2.32	2.40	1.25	1.05
Granite City Steel Co.	616,275	479,247	None	None	None	None	1.61	1.25	0.35	0.35
Lukens Steel Co.*†	928,394	1,570,309	None	None	None	None	2.92	4.94	1.00	0.50
Continental Steel Corp.	938,852	1,225,674	125,213	130,746	7.00	7.00	4.06	5.46	2.00	2.50
Alan Wood Steel Co.	739,590	1,051,772	502,768	502,768	7.00	10.00	1.18	2.75	None	None
Laclede Steel Co.	352,039	748,796	None	None	None	None	1.71	3.63	1.75	2.25
Northwestern Steel & Wire Co.	143,468	446,160	5,250	5,250	7.00	7.00	0.85	2.70	None	None
Colorado Fuel & Iron Corp.‡	2,580,135	2,288,318	None	None	None	None	4.58	4.06	1.75	1.00
Total (or average)	$187,800,166	$277,565,532	$43,069,257	$42,965,016	....	....	$4.55	$7.44	....	....

NA—Not available.
**Includes 50 cents paid Jan. 6, 1943.
†Paid on Prior Preference 5½%; no payments on Class A or B Preferred.
‡Data based on fiscal year ending June 30.
*†Fiscal year ended Oct. 10, 1942 and Oct. 11, 1941.
also $6.00 paid in 1941 and 1942 per share on prior preference.
§Includes $4,233,350 book value of subsidiary companies' stocks (not owned) last year; $5,140,116 in 1941.

††Includes treasury shares.
†*Payments on 6 per cent cumulative convertible preferred; "Net Income Before Dividends" columns and totals do not take into consideration requirements (not actual payments) for preferred dividends. In computing earnings per common share these totals, adjusted for preferred dividend requirements, are used. In arriving at earnings per common share for individual companies the same method is followed.
Boldface type is used under those columns in which figures from all 22 companies were not available.

PER

1926	6.86
1927	5.22
1928	6.55
1929	9.88
1930	4.54
1931	0.40

*Loss.

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urns from Twenty-Two Producers, Representing Over 90 Per Cent of Total Ingot Capacity

Funded Debt 1942	Funded Debt 1941	Surplus 1942	Surplus 1941	Total Capitalization 1942	Total Capitalization 1941	Total Income Before Dividends and Interest on Bonds 1942	Total Income Before Dividends and Interest on Bonds 1941	T
$139,694,841	$181,238,442	$412,300,125	$400,514,241	$1,569,253,316§	$1,599,917,799§	$77,971,961	$122,204,473	4
162,171,365	181,778,095	107,842,981	106,902,394	646,977,476	665,643,619	34,727,360	40,423,793	5
78,806,350	95,224,569	99,364,852	91,283,204	341,806,143	350,775,864	21,354,976	28,433,551	6
57,865,464	60,931,348	100,787,716	95,429,727	213,654,980	211,227,751	13,767,663	18,944,456	6
37,360,000	46,680,000	51,165,685	48,732,890	149,504,994	156,392,200	12,227,238	16,199,271	8
† 47,922,882	40,375,000	67,690,052	63,796,476	242,929,763	216,055,102	11,634,904	16,970,609	4
68,636,082	74,796,352	41,793,805	37,150,620	230,517,940	232,035,025	12,717,200	18,746,146	5
33,600,000	34,800,000	23,422,324	21,644,682	121,816,874	121,244,982	5,644,891	9,773,825	4
8,220,864	8,380,000	19,728,233	18,520,163	49,038,308	47,533,653	2,981,781	3,513,829	6
13,892,000	15,700,000	21,442,166	19,082,583	79,154,224	78,844,526	5,383,390	7,978,762	6
None	None	22,008,985	19,679,699	32,709,091	30,390,768	4,861,484	5,062,709	14
900,000	1,600,000	8,104,243	7,412,108	19,275,773	19,283,638	1,412,472	1,668,754	7
1,250,000	1,714,702	13,241,142	12,101,453	19,084,306	18,409,319	1,646,283	1,679,837	8
2,050,000	2,400,000	5,767,443	4,543,002	10,569,590	9,057,028	2,733,948	2,355,346	25
None	600,000	7,704,680	6,800,500	10,861,480	10,557,300	1,771,927	1,860,951	16
2,670,639	3,128,777	4,367,703	3,885,299	15,522,164	15,497,897	738,279	618,652	4
2,200,000	3,212,700	6,076,018	5,465,600	11,455,778	11,858,060	1,014,690	1,755,040	8
1,200,000	1,400,000	6,091,222	5,687,840	14,333,096	14,220,123	983,102	1,275,924	6
None	None	4,132,040	3,895,218	15,703,362	15,466,540	739,590	1,051,772	4
750,000	750,000	1,637,578	1,846,477	6,512,578	6,721,477	367,039	760,046	5
681,641	798,203	2,355,299	2,413,395	3,929,765	4,104,423	189,177	504,285	3
11,035,200	15,518,200	18,870,574	17,180,988	35,541,974	38,335,388	3,356,045	3,064,228	9
$670,907,328	$771,026,388	$1,045,894,866	$993,968,559	$3,840,152,975	$3,873,572,482	$218,225,400	$304,846,259	5

Income Per Common Share 1942	Income Per Common Share 1941	Dividends Paid Per Share on Common 1942	Dividends Paid Per Share on Common 1941	Operating Rate Per Cent 1942	Operating Rate Per Cent 1941	Total Taxes 1942	Total Taxes 1941	Total Assets 1942	Total Assets 1941
$5.35	$10.45	$4.00	$4.00	NA	NA	$228,001,058	$191,502,574	$2,123,435,264	$2,045,021,088
6.31	9.35	6.00	6.00	98.0	101.5	185,704,093	108,411,074	994,726,523	862,608,194
2.67	3.87	1.25	2.00	99.6	99.5	77,623,997	57,277,622	411,263,789	420,186,075
5.41	7.75	3.00	3.25	NA	NA	36,682,487	25,985,443	255,069,259	248,550,326
6.57	9.08	4.50	5.00	102.3	103.7	26,648,084	26,788,272	179,932,888	177,527,538
4.50	9.77	2.50**	2.60	102.8	98.7	31,900,744	22,142,299	299,495,730	258,169,873
5.66	9.13	2.50	3.00	99.8	103.3	29,004,000	26,593,000	260,248,971	262,163,072
4.61	11.71	1.50	2.00	97.7	99.9	9,253,884	10,521,674	132,431,412	132,861,390
3.19	4.54	None	None	NA	NA	7,263,823	4,946,141	58,436,477	56,892,364
7.26	12.96	2.00	1.00	NA	NA	28,589,095	18,059,339	137,637,227	110,937,278
3.71	3.86	2.00	2.25	95.6	77.8	17,808,490	11,431,656	48,081,263	43,688,145
2.76	3.40	1.00	1.00	100.0	111.0	4,197,357	3,138,322	22,471,723	22,902,870
3.48	3.44	1.00	0.50	99.2	99.2	1,775,569	929,446	22,092,411	20,198,312
2.76	2.42	0.75	0.60	NA	NA	7,877,051	5,785,244	18,486,994	15,472,285
2.32	2.40	1.25	1.05	96.0	111.0	1,711,289	1,454,126	12,658,056	11,833,308
1.61	1.25	0.35	0.35	100.6	105.1	727,996	548,793	17,411,070	17,353,905
2.92	4.94	1.00	0.50	94.3	74.4	3,295,535	1,280,060	19,856,911	15,672,819
4.06	5.46	2.00	2.50	95.5	95.4	993,680	1,335,320	16,685,034	17,254,172
1.18	2.75	None	None	NA	NA	1,811,731	2,019,885	19,363,253	19,227,876
1.71	3.63	1.75	2.25	NA	NA	573,766	1,182,493	7,723,069	8,538,328
0.85	2.70	None	None	52.6	40.1	661,346	472,484	5,686,759	5,676,226
4.58	4.06	1.75	1.00	98.0	79.0	4,626,662	2,331,344	52,221,080	47,075,157
$4.55	$7.44	....	....	....	....	$706,731,737	$524,136,611	$5,115,415,163	$4,819,810,601

PER CENT EARNED ON CAPITALIZATION

1926	6.86	1932	2.85*	1938	0.59		
1927	5.22	1933	0.90*	1939	4.27		
1928	6.55	1934	0.36	1940	7.57		
1929	9.88	1935	2.09	1941	7.87		
1930	4.54	1936	4.40	1942	5.68		
1931	0.40	1937	6.07				

*Loss.

for 1942

ity

Per Cent Total Income on Capitalization		Net Sales		Net Profit Margin Per Cent		
1942	1941	1942	1941	1942	1941	
4.97	7.64	NA	NA	NA	NA	United States Steel Corp.
5.37	6.07	$1,511,672,299	$961,240,737	1.68	3.58	Bethlehem Steel Corp:
6.25	8.11	517,892,134	480,542,106	3.31	5.00	Republic Steel Corp.
6.44	8.97	219,851,176	200,575,863	5.43	8.53	National Steel Corp.
8.18	10.36	189,612,004	202,755,157	5.65	7.31	Inland Steel Co.
4.79	7.85	234,982,038	216,009,805	4.32	7.18	Jones & Laughlin Steel Corp.
5.50	8.08	217,856,260	226,215,430	4.73	7.13	Youngstown Sheet & Tube Co.
4.63	8.06	118,988,790	131,205,180	3.73	6.48	Wheeling Steel Corp.
6.08	7.39	70,995,700	61,453,985	3.50	5.16	Pittsburgh Steel Co.
6.80	10.02	187,204,854	127,753,668	2.60	5.82	Crucible Steel Co. of America
14.9	16.7	108,529,076	91,217,999	4.5	5.6	Allegheny Ludlum Steel Corp.
7.20	8.40	35,780,190	31,948,516	3.90	5.10	Sharon Steel Corp.
8.63	8.57	NA	NA	NA	NA	Wickwire Spencer Steel Co.
25.87	26.01	32,116,888	25,625.376	8.23	9.10	Rustless Iron & Steel Corp.
16.31	17.63	15,872,463	17,644,559	11.08	10.29	Keystone Steel & Wire Co.
4.76	3.99	17,737,567	18,682,210	3.47	2.56	Granite City Steel Co.
8.86	14.8	34,466,008	25,138,582	2.69	6.25	*†Lukens Steel Co.
6.86	8.97	22,865,882	25,653,651	4.11	4.78	Continental Steel Corp.
4.71	6.80	30,262,976	27,831,929	2.44	3.78	Alan Wood Steel Co.
5.64	11.31	13,183,648	15,213,984	2.67	4.92	Laclede Steel Co.
3.52	12.30	12,208,193	11,356,822	1.20	3.90	Northwestern Steel & Wire Co.
9.44	7.99	52,130,923	39,241,034	4.95	5.83	‡Colorado Fuel & Iron Corp.
5.68	7.87	$3,644,209,069	$2,937,306,593	3.14	5.44	Total (or average)

Current Assets		Current Liabilities		
1942	1941	1942	1941	
$906,770,606	$783,460,857	$383,491,979	$287,666,561	United States Steel Corp.
511,613,297	388,819,038	306,252,740	176,330,402	Bethlehem Steel Corp.
151,930,932	156,441,142	41,510,639	45,600,106	Republic Steel Corp.
77,141,151	71,126,593	31,945,927	32,120,387	National Steel Corp.
75,872,142	74,449,161	19,977,165	14,343,355	Inland Steel Co.
125,172,533	100,983,425	47,105,310	33,879,227	Jones & Laughlin Steel Corp.
116,113,484	111,152,352	20,267,946	23,055,513	Youngstown Sheet & Tube Co.
52,044,328	52,592,725	8,407,829	9,027,258	Wheeling Steel Corp.
23,868,300	21,158,006	7,943,301	8,459,928	Pittsburgh Steel Co.
89,280,357	60,257,286	51,572,387	25,701,697	Crucible Steel Co. of America
28,187,214	25,009,609	13,535,770	12,480,932	Allegheny Ludlum Steel Corp.
11,650,521	11,619,479	3,195,951	3,619,232	Sharon Steel Corp.
10,922,212	9,025,649	2,472,456	1,602,361	Wickwire Spencer Steel Co.
11,590,639	9,155,963	6,958,554	5,416,695	Rustless Iron & Steel Corp.
4,710,504	4,169,798	1,691,132	1,128,290	Keystone Steel & Wire Co.
7,270,706	6,841,007	1,622,988	1,624,531	Granite City Steel Co.
12,412,432	7,243,271	7,907,372	4,601,226	*†Lukens Steel Co.
7,840,496	8,890,616	1,316,551	1,980,654	Continental Steel Corp.
8,843,728	8,671,614	3,062,139	3,266,934	Alan Wood Steel Co.
3,853,969	4,509,550	675,491	1,480,351	Laclede Steel Co.
1,962,430	1,843,729	1,396,842	1,097,386	Northwestern Steel & Wire Co.
24,850,564	19,896,098	13,105,934	5,743,038	‡Colorado Fuel & Iron Corp.
$2,263,902,545	$1,937,316,968	$975,416,353	$700,226,064	Total (or average)

Uniform Price Adjustment Policy Adopted by Procurement Agencies

UNIFORM policies of renegotiation of war contracts have been adopted by the Army, Navy, Treasury and Maritime Commission. The move is designed to eliminate the objection of industries that the price adjustment methods and policies of the four procurement agencies varied widely and caused unnecessary loss of time and effort in collecting data to be submitted.

In a joint statement the four agencies said that "in the present emergency the existence of excessive profits does not necessarily indicate the contractor has taken undue advantage of the government or that the contracting officers have failed to exercise good judgment under all the circumstances . . .

"Industry has been asked to produce war equipment for which accurate cost data did not or does not exist. Under the circumstances, costs and profits, at the time contracts are made may, at best, represent estimates. As a result, contractors, in many instances are left with profits which they neither anticipated nor wish to retain."

The law provides the procurement agencies and the contractors will determine, by agreement, the amount of these profits which exceed a fair margin.

Broadly speaking the following principles have been agreed upon by the four boards in determining excessive profits:

1—That the stimulation of quantity production is of primary importance.

2—That reasonable profits in every case will be determined with reference to the particular performance factors present without limitation or restriction by any fixed formula with respect to rate of profit or otherwise.

3—That the profits of the contractor ordinarily will be determined on his war business as a whole for a fiscal period, rather than on specific contracts separately, with the possible exception of certain construction contracts. Fixed price contracts are negotiated separately from fees on cost-plus-fixed-fee contracts.

4—That as volume increases the margin of profit should decrease. This is particularly true in those cases where the amount of business done is abnormally large in relation to the amount of the contractor's own capital and company-owned plant, and where such production is made possible only by capital and plant furnished by the government.

5—That in determining what margin of profit is fair, consideration should be given to the corresponding profits in pre-war base years of the particular contractor and for the industry, especially in cases where the war products are substantially like pre-war products. It should not be assumed, however, that under war conditions, a contractor is entitled to as great a margin of profit as that obtained under competitive conditions in normal times.

6—That the reasonableness of profits shall be determined before provision for federal income and excess profits taxes.

7—That a contractor's right to a reasonable profit and his need for working capital should be differentiated. A contractor can not be expected to earn excessive profits on war contracts merely because he lacks adequate working capital in relation to a greatly increased volume of business.

More Metalworking Advisory Committees Appointed by WPB

New industry advisory committees organized in the metalworking field by the War Production Board include:

Cranes and Hoists

John S. Chafee is government presiding officer, members: S. Buckley, Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.; J. M. Etienne, Cyclops Iron Works, San Francisco; H. T. Florence, The Cleveland Crane & Engineering Co., Wickliffe, O.; Gerald Frink, Washington Iron Works, Seattle; W. Harnischfeger, Harnischfeger Corp., Milwaukee; Hoyt E. Hayes, Industrial Brownhoist Corp., Bay City, Mich.; C. B. Veit, Wright Mfg. Division, American Chain & Cable Co. Inc., York, Pa.; Stanley M. Hunter, American Hoist & Derrick Co., St. Paul, Minn.; R. B. Louden, The Louden Machinery Co., Fairfield, Iowa; J. R. McGiffert, Clyde Iron Works Inc., Duluth, Minn.; J. E. Minty, Manning, Maxwell & Moore Inc., Muskegon, Mich.; W. W. Peattie, Northern Engineering Works, Detroit; Edgar C. Rice, Whiting Corp., Harvey, Ill.

Welded, Weldless Chains

Conrad A. Goldstrohm is government presiding officer, members: Frank A. Bond, The McKay Co., Pittsburgh; George Campbell, International Chain & Mfg. Co., York, Pa.; L. D. Cull, The Cleveland Chain & Mfg. Co., Cleveland; F. G. Hodell, The Hodell Chain Co., Cleveland; Edgar Littman, Nixdorf-Krein Mfg. Co., St. Louis; Theodore Russell, J. M. Russell Mfg. Co., Naugatuck, Conn.; Charles C. Swartz, The H & O Chain Co. Inc., South Norwalk, Conn.; E. M. Taylor, S. G. Taylor Chain Co., Hammond, Ind.; J. S. Butler, American Chain Division, American Chain & Cable Co. Inc., York, Pa.; A. L. McKinnon, Columbus McKinnon Chain Corp., Tonawanda, N. Y.

Electric Soldering Iron Industry

Max Coe, general manager, Stanley Tools, New Britain, Conn.; A. L. Johnson, Hexacon Electric Appliance Co., Roselle Park, N. J.; H. W. Maltz, president, Nu-Tone Laboratories Inc., Chicago; R. C. Persons, sales manager, Vasco Electric Mfg. Co., Los Angeles; E. W. Doherty, vice president, American Electrical Heating Co., Detroit; Walter E. Kuehl, president, Drake Electric Works, Chicago; F. E. Merriman, general manager, Vulcan Electric Co., Danvers, Mass.; L. P. Young, Electric Soldering Iron Co., Deep River, Conn.

Steel Packaging

Government presiding officer is E. G. Plowman. Members are: C. H. Bull, Jones & Laughlin Steel Corp., Pittsburgh; E. I. Burke, Republic Steel Corp., Cleveland; C. A. Burkhalter, Wheeling Steel Corp., Wheeling, W. Va.; A. J. Detour, Great Lakes Steel Corp., Detroit; E. H. Dorenbusch, American Rolling Mill Co., Middletown, O.; M. L. Eversole, Inland Steel Co., Chicago; R. K. Keas, Laclede Steel Co., St. Louis; C. F. McBride, Pittsburgh Steel Co., Pittsburgh; C. E. Miller, United States Steel Corp., Pittsburgh; F. N. Pattengell, Youngstown Sheet & Tube Co., Youngstown, O.; H. H. Pratt, Crucible Steel Co. of America, New York; F. M. Starr, Bethlehem Steel Co., Bethlehem, Pa.

Warns "Black Market" in Tin Must Be Abolished

Unauthorized sales of tin and the continued use of the metal for purposes that are prohibited by the WPB's tin conservation order will not be tolerated, Erwin Vogelsang, director, Tin - Lead Division, declared. Black market operations in tin must and will be stopped.

The newly-formed Tin Products Industry Advisory Committee was summoned to Washington recently to discuss the conservation of tin.

Since all or nearly all nonessential uses of tin have already been entirely stopped, the principal problem now facing the industry and WPB is that of conserving the existing limited stocks.

Members of the Tin Products Industry Advisory Committee: H. C. Colket, North American Smelting Co., Philadelphia; Roger H. Cutting, Northwest Lead Co., Seattle; R. A. Gardiner, Gardiner Metal Co., Chicago; George Henning Jr., Belmont Smelting & Refining Works Inc., Brooklyn, N. Y.; Ralph Jacobson, Rotometals Inc., San Francisco; Lazarus Muscat, United American Metals Corp., Brooklyn, N. Y.; E. L. Newhouse Jr., Federated Metals Division, American Smelting & Refining Co., New York; P. C. Ripley, Kester Solder Co., Chicago; Fletcher W. Rockwell, National Lead Co., New York; J. A. Stone, Division Lead Co., Chicago.

Board of Economic Warfare is requesting that applicants for export licenses utilize existing frozen and distressed tin plate wherever possible to take care of export requirements. In those instances where applicants are willing to comply with this request but cannot locate existing stocks of tin plate of the specifications desired, BEW is asking them to communicate with its Requisitioning Division of the Office of Exports.

William Loren Batt, vice chairman, War Production Board, received the $10,000 Philadelphia Award recently as the citizen who performed the most distinguished service for the community in 1942. The award was established in 1921 by the late Edward W. Bok.

Road Builders Propose Five-Year $15,000,000,000 Construction Plan

"IF THE WAR should end in the near future, one-half of our working population, plus millions of our military forces, would be looking for jobs."

Upon this premise, the American Road Builders' Association, Washington, advocates a planned postwar highway construction program costing $3,000,000,000 a year for at least five years.

Highway construction, the association says, while providing needed facilities, offers an excellent opportunity for the absorption of manpower. "These objectives can be reached only by having available a shelf of projects, complete with plans, specifications and cost estimates, ready for contract at the end of the war. Neglecting to do this would result in the wasteful expenditure of funds for improvised relief work."

Every state, county, city and regional area should have a planned program of highway construction, the association believes. Reserve funds should be accumulated to finance postwar projects or to participate with the federal government on a matching or loan basis. Wasteful spending on improvised work programs will be the result of neglecting to provide plans, specifications and cost estimates for construction projects to be carried on after the war.

Airport construction, the association continues, must become an important part of the total construction program in the postwar years. Necessitating, as it does, the use of the same materials and equipment as highway construction, and the same type of engineering and contracting, it actually becomes a part of the highway program. While there is no precedent on which to base a forecast, it is not only possible but probable that there will be an expansion of air service in the 10-year period following the war, comparable to that of highway transportation following the last war. "The construction of airports will be a necessary part of our construction program."

The association's postwar program envisages the following conclusions:

1. There must be no unemployment.
2. Construction volume must be maintained at high level.
3. There must be a long-range highway construction program.
4. There must be no improvised relief work.
5. There must be a shelf of highway projects of sufficient size to insure an annual $3,000,000,000 program for at least five years.

Billions in Government-Owned Manufacturing Plants Pose Problem

DISPOSAL of government owned manufacturing facilities is one of the great domestic postwar problems, Secretary of Commerce Jesse H. Jones, declared at the sixteenth annual Army Day dinner in New York recently. He urged government and private business to get together on plans to utilize enough to assure a high level of employment, without resort to government ownership or operation and without sacrifice of what the government has built up during the war.

The Reconstruction Finance Corp. and other agencies under his supervision have authorized wartime expenditure of more than $20 billion. He said these activities extended to "every corner of the earth where we might obtain critical materials necessary for fighting a world war, and where we might buy things in competition with the Axis powers, necessary and vital to them . . .

"In addition to plants built directly by the War and Navy departments and the Maritime Commission, Defense Plant Corp., a subsidiary of RFC, has built and equipped 1479 plants and other facilities costing approximately $7 billion, all of which are owned by Defense Plant

"Aluminum and magnesium metals, for the manufacture of which we will have a tremendous capacity, are destined to play a very important role in our future economy, as also is synthetic rubber. We have an annual productive capacity of 2,150,000,000 pounds of aluminum (which will make more than 228,000 transport planes), more than half of which would be owned by the government, as against 327,000,000 pounds of privately owned in 1939.

"We will have an annual productive capacity of 600,000,000 pounds of magnesium, of which the government will own almost 90 per cent, as against 6,700,000 pounds privately owned in 1939."

Mr. Jones said the government's investment in facilities for the production and manufacture of aluminum and aluminum products will be in excess of $725,000,000; of magnesium, $410,000,000; synthetic rubber, $650,000,000.

"We will have invested in plants and facilities for the production and manufacture of airplanes, airplane engines, parts, instruments and accessories, $2,640,000,000. This is in addition to all such privately owned plants and facilities; alcohol and chemicals, more than $100,000,000; aviation gasoline, $125,000,000; plants for the manufacture of machine tools, $80,000,000; plants for the mining and processing of copper, lead, zinc and other minerals, $160,000,000; plants for the manufacture of guns, ammunition, tanks and armor, $440,000,000; radio equipment and scientific instruments, $60,000,000,000; shipbuilding, $150,000,000,000; and steel and pig iron, $710,000,000."

Mr. Jones said that government-owned steel plants will amount to about 10 per cent of the total in the United States.

"By the end of the war our productive capacity properly used can save the world, and improperly applied could become an economic menace," he declared.

Minerals Distribution To Affect Future Peace

Growth of industrialization has caused the interdependence of nations in mineral supplies to increase sharply and creates a crucial problem of postwar international relations. This is brought out in a study of world minerals and world peace by the Brookings Institution, Washington.

The study, conducted by C. K. Leith, J. W. Furness, and Cleona Lewis, deals with physical, economic, and political trends in the field of minerals throughout the world. It takes up the distribution of each important mineral, discussing the output of the known deposits and relating them to the peace needs and war demands of the various countries.

No nation is self-sufficient in minerals or is likely to be, but those which most nearly approach this situation are the United States, the British Empire, and Russia. Within their boundaries, the United States and the British Empire accounted for about 57 per cent of the world production in 1939. To this may be added commercial control of production elsewhere, bringing the total to around 75 per cent.

In 1939, the Axis powers produced a little less than 11 per cent of the

(*Please turn to Page* 155)

Index of Activity Reduced Slightly

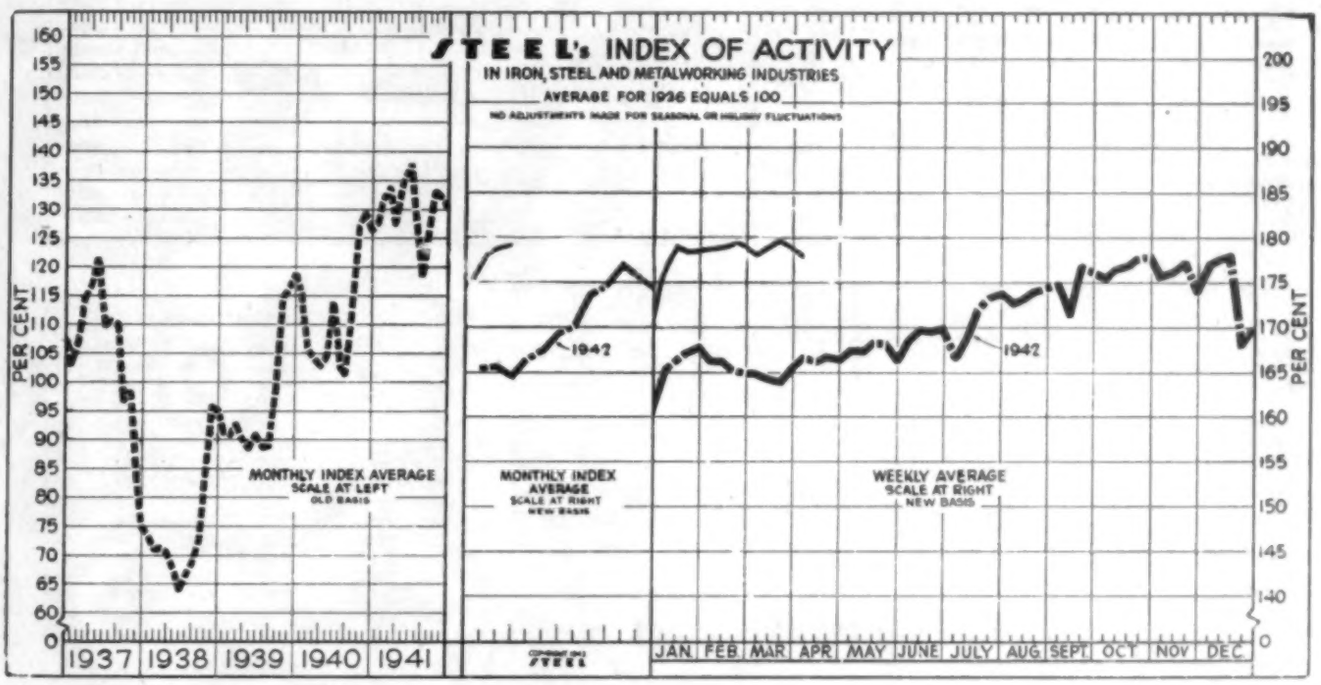
STEEL's index of activity turned downward to 177.9 for the week ended April 3. Reports of slightly contracted industrial output combined with decreased carloadings and lower electric power distribution to reduce the index to a level barely above that of the first week of January, notwithstanding the consistently high rate of steel production.

The usual spring decline in output of electrical energy is now apparent and the drop in power consumption during the latest week was marked. Distribution of kilowatt hours was 3,889,858,000, or 38,312,000 units less than in the previous week and the lowest total for any full week since Dec. 26. According to the Edison Electric Institute, the latest figure is 16.2 per cent above the total reported for the corresponding week of 1942, 3,348,608,000 kilowatt hours.

Loading of revenue freight for the period ended March 27 put 787,360 cars in use. This was 20,926 cars, or 2.6 per cent, under the comparable week last year. For the period ended March 20 loadings totaled 768,134. Preliminary reports for the seven days since March 27 indicate another decline in car use.

In January net operating income of major railroads was only 62 per cent of the December amount. The total, $105,304,000, compares with $68,966,000 in January, 1942, and with $62,020,000 in the same month of 1941. Aggregate earnings of the 'roads reached a peak of $184,680,000 in October last year and, after receding to a little less than $150,000,000 in November, established a secondary high point in the final month of the year with $170,851,000.

By-product coke output in January gained 881 tons over daily average production in December. One year earlier, daily coke output averaged 168,508 tons.



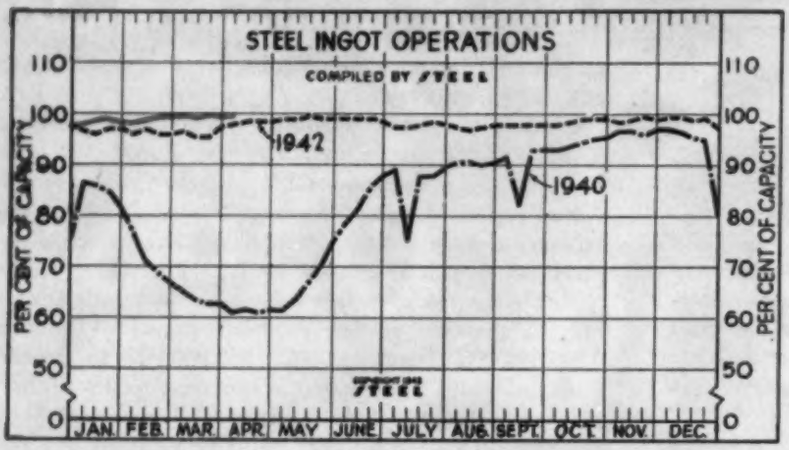
STEEL'S index of activity declined 1.3 points to 177.9 in the week ending April 3:

Week Ended	1943	1942
April 3	177.9†	166.7
Mar. 27	179.2	165.5
Mar. 20	179.6	163.9
Mar. 13	179.0	164.1
Mar. 6	178.2	164.8
Feb. 27	178.9	165.0
Feb. 20	179.0	165.1
Feb. 13	178.8	166.2
Feb. 6	178.6	166.3
Jan. 30	178.6	167.9
Jan. 23	178.1	167.4

†Preliminary.

Mo. Data	1943	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932
Jan.	178.1	165.7	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6
Feb.	178.8	165.6	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3
March	179.0	164.6	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2
April		166.7	127.2	102.7	89.8	70.3	116.6	100.8	85.0	83.6	52.4	52.8
May		167.7	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8
June		169.4	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4
July		171.0	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1
Aug.		173.5	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0
Sept.		174.8	126.4	113.5	98.0	72.3	96.8	86.7	69.7	56.9	68.0	46.5
Oct.		176.9	135.1	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4
Nov.		175.8	132.2	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5
Dec.		174.1	130.2	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2

Note: Weekly and monthly indexes for 1942 and 1943 have been adjusted to offset the forced curtailment in automobile production and to more accurately reflect expanding steel production



Steel Ingot Operations

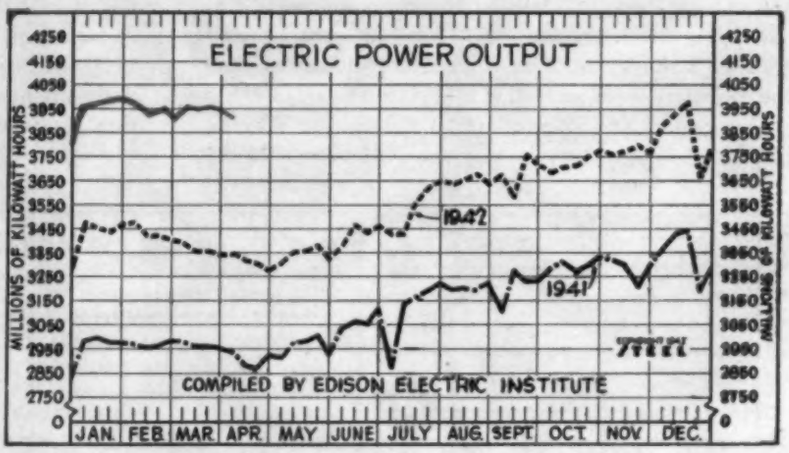
(Per Cent)

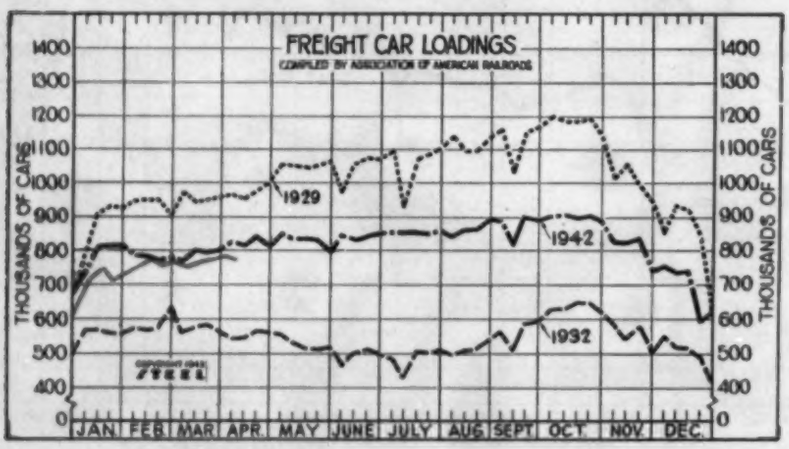
Week ended	1943	1942	1941	1940
April 3	99.5	98.0	99.5	61.5
Mar. 27	99.0	97.5	99.5	61.0
Mar. 20	99.5	95.5	99.5	62.5
Mar. 13	99.0	95.5	98.5	62.5
Mar. 6	99.5	96.5	97.5	63.5
Feb. 27	99.5	96.0	96.5	65.5
Feb. 20	99.5	96.0	94.5	67.0
Feb. 13	99.0	97.0	96.5	69.0
Feb. 6	98.5	96.0	97.0	71.0
Jan. 30	98.5	97.0	97.0	76.5
Jan. 23	99.0	97.0	95.5	84.5
Jan. 16	99.0	96.0	94.5	84.5
Jan. 9	97.5	96.5	93.0	86.0
Jan. 2	97.5	97.5	92.5	86.5
Week ended	**1942**	**1941**	**1940**	**1939**
Dec. 26	99.0	93.5	80.0	75.5

Electric Power Output

(Million KWH)

Week ended	1943	1942	1941	1940
April 3	3,890	3,349	2,779	2,381
Mar. 27	3,928	3,345	2,802	2,422
Mar. 20	3,947	3,357	2,809	2,424
Mar. 13	3,945	3,357	2,818	2,460
Mar. 6	3,946	3,392	2,835	2,464
Feb. 27	3,893	3,410	2,825	2,479
Feb. 20	3,949	3,424	2,820	2,455
Feb. 13	3,939	3,422	2,810	2,476
Feb. 6	3,960	3,475	2,824	2,526
Jan. 30	3,977	3,468	2,830	2,541
Jan. 23	3,974	3,440	2,980	2,661
Jan. 16	3,952	3,450	2,996	2,674
Jan. 9	3,953	3,473	2,985	2,688
Jan. 2	3,780	3,289	2,831	2,558
Week ended	**1942**	**1941**	**1940**	**1939**
Dec. 26	3,656	3,234	2,757	2,465
Dec. 19	3,976	3,449	3,052	2,712


ELECTRIC POWER OUTPUT
MILLIONS OF KILOWATT HOURS
1942
1941
COMPILED BY EDISON ELECTRIC INSTITUTE
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.



Freight Car Loadings

(1000 Cars)

Week ended	1943	1942	1941	1940
Apr. 3	775	829	683	603
Mar. 27	787	805	792	628
Mar. 20	768	797	768	620
Mar. 13	769	799	758	619
Mar. 6	748	771	742	621
Feb. 27	783	781	757	634
Feb. 20	752	775	678	595
Feb. 13	765	783	721	608
Feb. 6	755	784	710	627
Jan. 30	735	816	714	657
Jan. 23	709	818	711	649
Jan. 16	755	811	703	646
Jan. 9	716	737	712	668
Jan. 2	621	674	614	592

‡Preliminary.

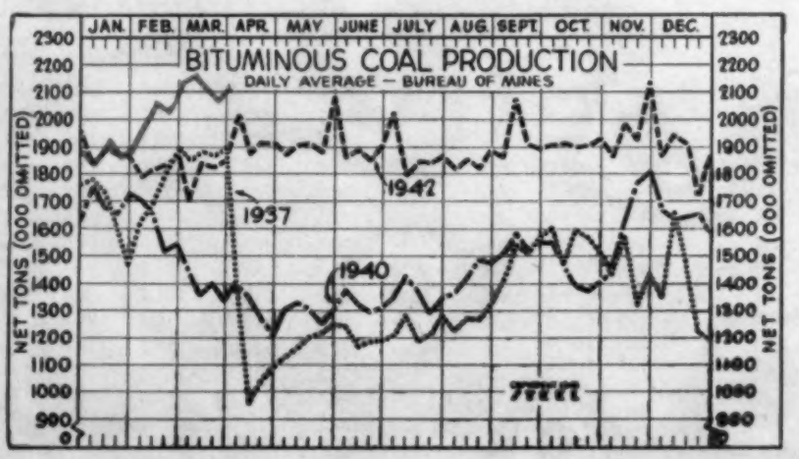
Bituminous Coal Production

Daily Average

Net Tons (000 omitted)

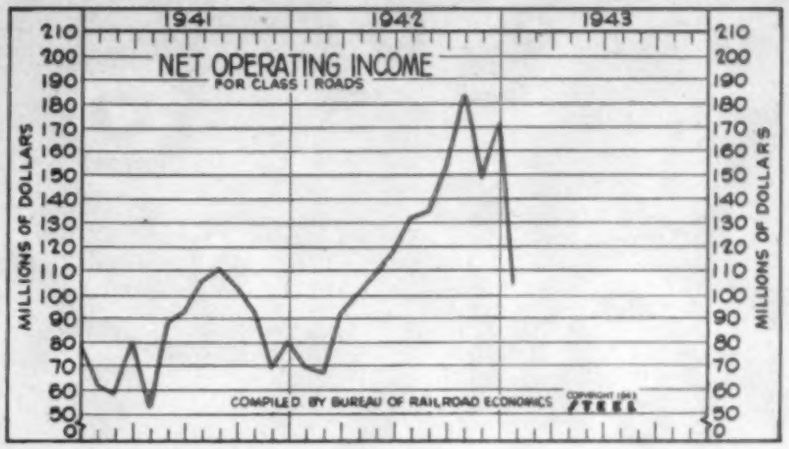
Week ended	1943	1942	1941	1937
Mar. 27	2,100‡	1,858	1,950	1,895
Mar. 20	2,060	1,825	1,879	1,871
Mar. 13	2,100	1,842	1,844	1,883
Mar. 6	2,125	1,693	1,791	1,851
Feb. 27	2,113	1,878	1,736	1,897
Feb. 20	2,027	1,833	1,736	1,807
Feb. 13	2,033	1,817	1,736	1,696
Feb. 6	1,980	1,793	1,683	1,634
Jan. 30	1,900	1,866	1,684	1,466
Jan. 23	1,867	1,886	1,656	1,605
Jan. 16	1,929	1,883	1,609	1,781
Jan. 9	1,883	1,842	1,691	1,786
Jan. 2	1,800	1,960	1,762	1,784

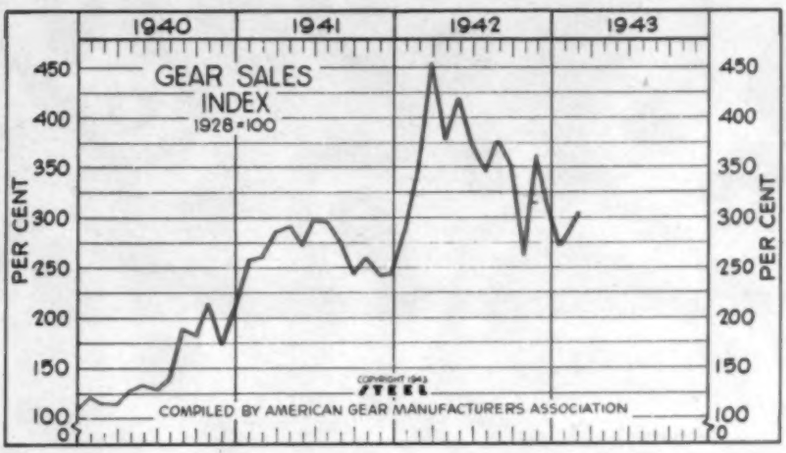
‡Preliminary.


BITUMINOUS COAL PRODUCTION
DAILY AVERAGE — BUREAU OF MINES
NET TONS (000 OMITTED)
1942
1937
1940
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

Class I Railroads
Net Operating Income
(Unit: $1,000,000)

	1943	1942	1941	1940
Jan.	$105.30	$68.97	$62.02	$46.01
Feb.		66.49	58.48	32.86
Mar.		92.39	80.63	37.03
April		102.03	52.57	34.12
May		109.63	88.63	47.41
June		118.73	93.26	48.09
July		133.00	106.31	57.73
Aug.		135.26	111.32	66.53
Sept.		154.63	104.07	74.72
Oct.		184.68	93.66	87.64
Nov.		148.95	68.76	72.00
Dec.		170.85	80.55	78.79
Average		$123.80	$83.29	$56.84



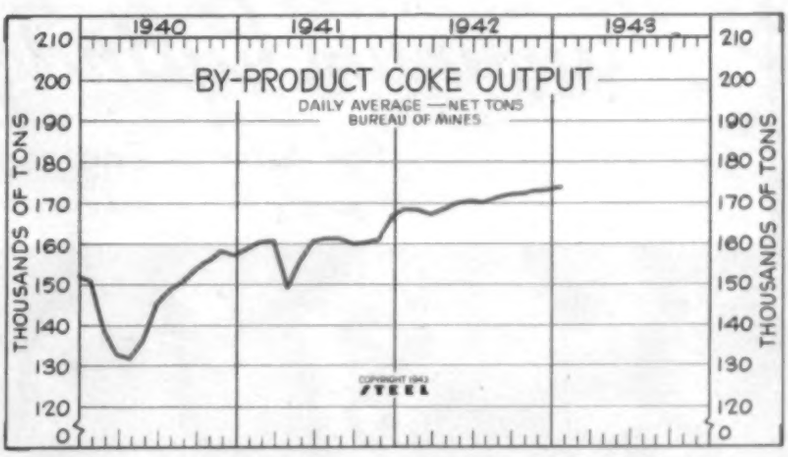


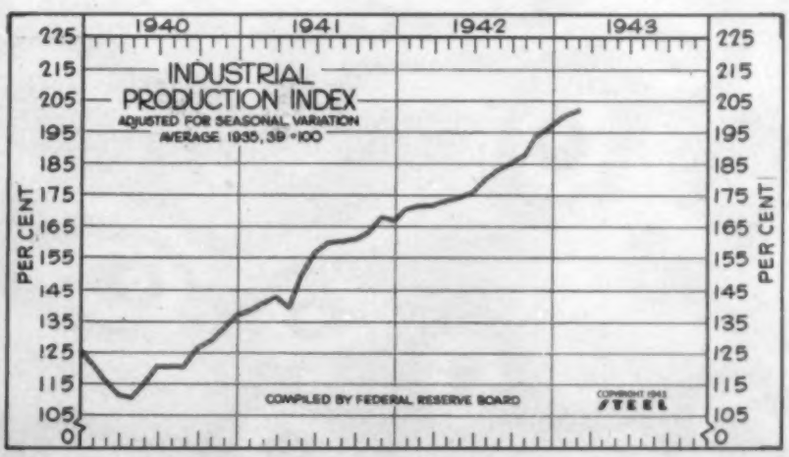
Gear Sales Index
(1928 = 100)

	1943	1942	1941	1940	1939
Jan.	268	288	259	123	91.0
Feb.	303	353	262	116	86.0
Mar.		455	288	114	104.0
April		378	292	128	88.0
May		421	273	133	93.0
June		373	299	129	90.0
July		344	298	141	89.0
Aug.		380	276	191	96.0
Sept.		351	243	183	126.0
Oct.		263	261	216	141.0
Nov.		359	241	173	126.0
Dec.		300	243	208	111.0
Ave.		355	269.6	155.0	103.0

By-Product Coke Output
(Daily Average)

	1943	1942	1941	1940
Jan.	174,044	168,508	159,129	151,841
Feb.		168,414	160,789	138,508
March		167,733	161,268	133,056
April		168,960	149,144	132,812
May		170,187	156,318	136,897
June		170,593	161,201	145,821
July		170,244	161,731	149,005
Aug.		171,443	161,709	151,035
Sept.		172,110	160,193	154,247
Oct.		172,211	160,344	156,118
Nov.		173,029	161,116	158,331
Dec.		173,163	167,304	157,743
Total		170,549	160,037	147,157





Industrial Production
Federal Reserve Board's Index
(1935-39 = 100)

	1943	1942	1941	1940	1939
Jan.	199	171	139	122	102
Feb.	203†	172	141	116	101
March		172	143	112	101
April		173	140	111	97
May		174	150	115	97
June		176	157	121	102
July		180	160	121	104
Aug.		183	160	121	104
Sept.		185	161	127	113
Oct.		189	163	129	121
Nov.		194	168	133	124
Dec.		197	167	138	126
Year Ave.		181	154	122	108

†Preliminary.

Advanced Practices at Servel Foundry
Keep Scrap Low in Casting . . . . . .

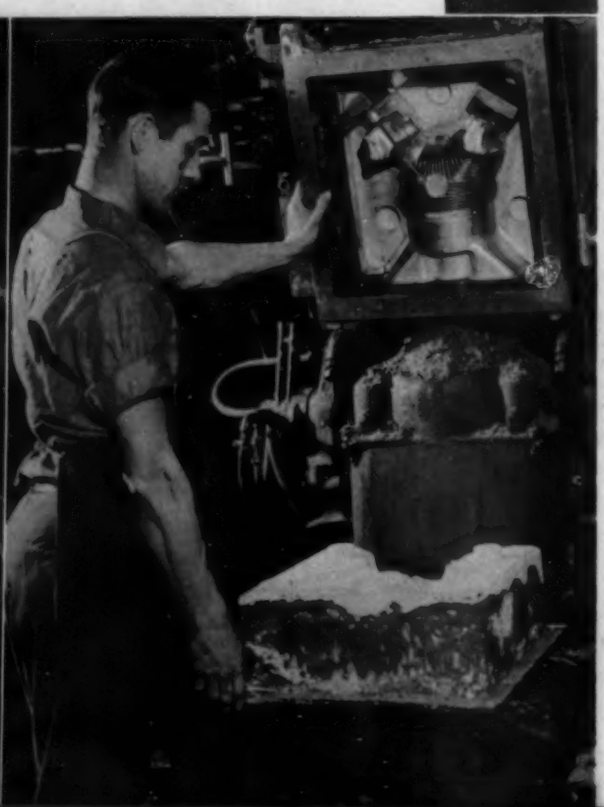
Aluminum Cylinder Heads

For Aircraft Engines

By G. ELDRIDGE STEDMAN

(1)

(2)



SCRAP was running at the remarkably low value of only a few per cent the day the writer visited the Servel aluminum foundry at Evansville, Ind. It is not unusual for a foundry pouring this complicated and critical casting to have to scrap as much as 30 per cent. Obviously only the utmost in advanced foundry practice can hold scrap to a figure of only a few per cent. (Actual value deleted by censor). But before detailing the *know-how*, let's examine the *how-come* of Servel's foundry practice.

As a leading manufacturer of gas appliances, Servel ranked as one of the top American industries in 1939. As is typical of Louis Ruthenburg, president, he discerned the possibility of total conversion to war production back in 1939. While his plant was more or less vulnerable in that Servel production did not require machine tools particularly adaptable to war production, he knew he had a facile and adaptable staff. He mustered it promptly to the task of negotiating war contracts of any sensible nature that would maintain and increase Servel productivity.

Going everywhere in its search, this staff studied blueprints on over 1000 items. Today the plant is jam-packed with a diversity of war production work in which all previous employment records have been broken—wing sections for Army aircraft, breech casings for anti-aircraft guns, burners for quartermaster ranges, even the wood mill is sawing cargo bodies for army trucks. Not the least of these undertakings is the one to be described. . .the intricate sand casting of aluminum cylinder heads for Jacobs and Pratt & Whitney aircraft engines—one of the most difficult foundry jobs to be found because of the many thin, closely spaced fins employed to dissipate heat from the cylinder heads.

In 1941, W. E. Baker, Servel's able vice president in charge of manufacturing, grabbed Grant Fink away from his job as manager of Rural Sales and, as his assistant, set him to finding and expediting war work. Fink's success is a good answer to those who depreciate the contribution of sales executives to war effort.

Servel had a grey iron and aluminum foundry in which it had at one time made all its evaporators, casting aluminum around a steel pipe coil—a delicate job. This foundry was lying practically idle. That promptly bothered Fink. Whenever he wrote a letter to anyone, anywhere, he would mention that Servel also had aluminum foundry facilities. Thus, when corresponding about a pilot seat assembly (which interested Servel in that it appeared to fit into its tube forming facilities, some of the most extensive in the world because of Servel refrigerator construction), Fink clausedinto his correspondence a plug for the idle foundry. Unexpectedly the plug lobbed under with a Washington call that sent Fink, along with Servel's foundry superintendent and metallurgist, hiking to visit one of the largest and most representative foundries making aircraft castings. With this data rounded into Servel *know-how*, Fink negotiated a massive contract with Jacobs Aircraft Engine Co., Pottstown, Pa., handled negotiations in Washington for equipment and material necessary for foundry enlargement, and is now expediting all requirements with the foundry in full pour.

That is the *how-come*.

L. V. Jewell, superintendent of Servel's pattern shop, grey iron and aluminum foundry, now has well over 200 employes under his control. He is the man who melted down the *know-how* of all the plants visited, added much from his own rich experience and came out with the present ability to hit a low scrap percentage. Fig. 1 shows Mr. Jewell and his staff.

This Jacobs cylinder head is cast in Alcoa aluminum alloy, casting dimensions are plus 1/32-inch, with finish dimensions plus 0.005-inch. This is a particularly critical sand casting, the barrel being approximately 8½ inches outside diameter with about three-fourths of its surface finned. These fins are only ⅛ to 3/16 inches apart and vary in depth from ¾ to over 3 inches. The pouring involves a cope and drag, barrel and barrel core, intake and exhaust

Fig. 1—Supervisory staff at Servel aluminum foundry: L. to R.—Charles Voyles, pattern shop; Charles Marx, aluminum molding and cleaning; L. V. Jewell, superintendent; L. F. Joest, core room; George Knapp, night supervisor; R. Diefenbach, assistant superintendent

Fig. 2—Setting reinforcing rails in fin body core

Fig. 3—Fin body core after pattern is drawn. Note deep, thin fins in pattern

Fig. 4—Cores for barrel, port and rocker boxes entering core oven

rocker and port with a number of related cores. The finished casting weighs 16.6 pounds. An almost identical casting is poured for the Pratt & Whitney cylinder head, its finished weight being 16 pounds. In finishing the casting about half the original metal weight is cut off and returned as remelt material.

The alloy employed provides superior casting qualities and higher mechanical properties than are possible with pure aluminum. Through this combination of alloying elements, strength is increased, elongation is reduced, yield strength and hardness is increased. Further increase in physical properties is attained by heat-treating processes. The Servel pouring mixture is approximately 60 per cent remelted gates and sprues and 40 per cent virgin alloy pig.

According to B. A. Daley, Servel's chief metallurgist, copper, nickel and magnesium are the alloying constituents chiefly responsible for the properties of the alloy. The particular combination of copper, nickel and magnesium in this alloy makes it responsive to solution and precipitation or aging heat treatments which materially increase the physical properties over those obtained in the "as cast" condition. In addition, this alloy analysis gives castings that retain their strength well at elevated temperatures, besides offering good bearing characteristics—features which make the alloy well suited for use in aircraft engine cylinder heads.

Titanium appears in the analysis as a residue from the use of a titanium-rich aluminum composition which is added to the melt just before pouring in order to control grain size. Servel not only works toward the fine grain so greatly desired in highly stressed aluminum castings by careful control of maximum temperature throughout the melting practice, but insures fine grain by making this small titanium addition to the melt just before pouring.

An important step in the production of cylinder heads of this analysis is the fluxing of the melt so that sound castings, free from dross and porosity are obtained. Fluxing is accomplished by bubbling chlorine gas through the melt just prior to the titanium addition before pouring. This chlorinating practice is a particularly effective means of cleaning the melt in that it combines a chemical fluxing action with mechanical agitation and sweeping actions.

Servel foundry practice on this Jacobs cylinder head involves a sequence of eighteen major steps. To give an overall picture, these are: (1) An elevated sand mixer flows down to (2) a core making battery which molds cope, drag and related cores that are racked (3) into baking ovens and, (4) having been cleaned, are conveyed by cars on a monorail system to (5) the assembly

Fig. 5—Fin body cores leaving baking oven. Racks are suspended from overhead monorail system by heavy springs, assuring minimum vibration

Fig. 6—Spraying fin body core

Fig. 7—Gaging the barrel core, left and using an acetylene flame to smoke the fin body mold at right

Fig. 8—Workman at left is blowing loose sand from a fin body mold while worker at right is setting a rocker-arm-box core in place in a fin body mold

bench upon which all related parts are joined together in a (6) clamped cope and drag, the resulting mold being rolled on a gravity conveyor system into (7) the pouring zone. Resulting castings (8) are knocked out and removed (9) to bandsaws where gates and risers are removed, after which (10) initial sand blasting brings the castings to (11) the grinders. Next they are (12) chipped and given a (13) reamed finish, after which they receive (14) a final satin finish by sand blasting and proceed to (15) final inspection. From there they are trucked to (16) heat treat and thereafter are (17) crated in cardboard cartons and (18) shipped to the Jacobs plant in Pennsylvania.

Mr. Jewell, Servel superintendent, has on his staff: R. E. Diefenbach, assistant superintendent; L. F. Joest, core room foreman; Charles Marx, in charge of processing, pouring, assembly and heat treat; George Knapp, general night superintendent; C. Voyles, foreman of the pattern shop. See Fig. 1. The foundry operates its own pattern shop with 11 patternmakers. A large additional installation of equipment has more than doubled its capacity.

Perhaps the main factor contributing to the Servel record of low scrap is its sand-mixing formula and procedure—the result of exhaustive experiments in which sand mixtures of original design have been perfected. Three mixes are involved: (1) Facing sand for fins and cylinder heads; (2) backing sand for cylinder heads; (3) core sand for barrel, rocker and ports.

The fins of the mold are fortified with 18-gage core wire nails, 3 inches long, pointed at each end, 370 of them to a cope or drag. See Fig. 2. These molds are produced on Tabor core machines, 22 and 30-inch sizes, tightly rammed to prevent rough castnigs. Fig. 3 shows one of these machines. After the molds are made, they are sprayed on a revolving fixture with core spray while yet green and before going to the ovens, Figs. 4 and 5.

The green molds are passed through a bake oven which is automatically controlled with Leeds & Northrup instruments, are taken out and cleaned. Next they are sprayed, Fig. 6, and then are returned to the oven where they are baked. Loaded onto racks which are transported by monorail, the varied molds proceed to the assembly bench.

The rocker arms, barrel and port cores are given a light spray after coming from the ovens and then are baked again. Then they go to the assembly line or bench.

Sequence of assembly of cores and molds is that the drag and cope cores are lifted from the monorail cars to the bench and then are smoked with an acetylene flame, Fig. 7. The barrel is set in a fixture and the port cores are assembled to the barrel, then placed in the drag half of the mold and anchored by wire. This assembly is gaged with a special fixture, Fig. 7, which trues the barrel and port cores to the body core.

The rocker arm cores, Fig. 8, are secured to the core half of the mold with hot resin.

(Concluded Next Week)

Fig. 9—Making a mold for a test bar. Two test bars are made in each mold

Fig. 10—Pouring test bars. Two test bars are poured from each heat

Using lower grades of

Brass and Bronze Castings

By CARTER S. COLE
Metals Section, Specifications Branch
Conservation Division
War Production Board
Washington

REAL conservation can be effected by specification changes based on a critical engineering examination of end use. The primary objective of that work is a better utilization of available material for maximum efficiency in the war effort. Numerous L and M orders of the WPB have shut off copper, tin and other scarce materials from nonessential civilian purposes. Even with this, taking the picture as a whole and more specifically referring to the primary metals, we do not have sufficient amount of these materials for our direct and indirect military needs and for items directly concerned with health and safety.

When copper, tin and other metals were cut off from their civilian uses, some of the normal channels in which these materials regularly flowed were closed. As a result lower grades of secondary material are relatively much more available than primary metals.

From *The Foundry*.

Brass mill scrap on the other hand has been routed back to the brass mills for reprocessing. In normal times, copper clippings and similar high purity scrap were used to sweeten, or upgrade, casting alloys. So the ingot makers and the foundrymen have had to work with materials having higher impurities than those to which they were accustomed.

In this connection specifications have been carefully reviewed by Army, Navy, and federal specification committees, the American Society for Testing Materials, and the Society of Automotive Engineers. Others, too, have co-operated, including many of the larger industrial companies that write their own specifications. In liberalizing specifications, requirements for virgin metal have been removed, impurity limits have been raised, and specifications for new alloys written so that material currently available could be used to better advantage. The materials engineer thus has given the designing engineer the tools with which he may work. It is the designing engineer's responsibility from here on to make use of these tools in the most effective manner possible. The accompanying chart can serve as a guide and the table gives a ready cross-reference to the applicable approximately equivalent specifications.

The chart shows most of the important specifications grouped in columns according to the material required by an ingot maker or foundryman. Four classifications are given. *All New Metal* includes No. 1 and 2 copper as well as electrolytic. *High Purity Secondary* is exemplified by such items as fired cartridge cases currently used to make regular manganese bronze. In any specification where the lead is equal to or greater than the tin, the tin content of bronzes generally can be introduced into the alloy from secondary sources such as sweated or unsweated radiator cores. Lead is generally the contamination of our secondary supply that restricts the use of material in our tighter specifications. Such in general, are the considerations governing

(*Please turn Page* 148)

DOWN-GRADING CHART FOR BRASS AND BRONZE CASTINGS SHOWING SPECIFICATIONS AND MATERIAL REQUIREMENTS

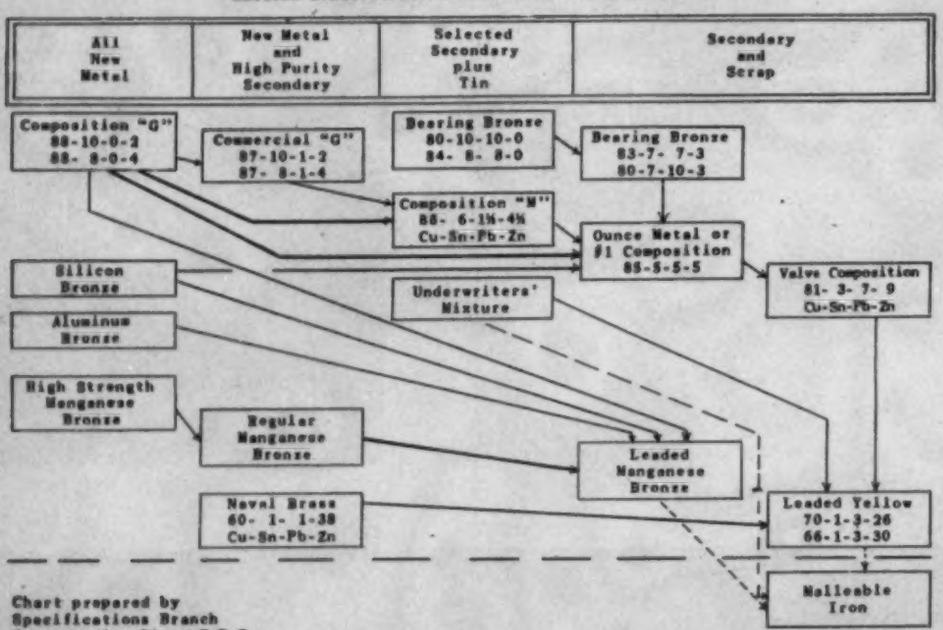

All New Metal
New Metal and High Purity Secondary
Selected Secondary plus Tin
Secondary and Scrap
Composition "G" 88-10-0-2 88- 8-0-4
Commercial "G" 87-10-1-2 87- 8-1-4
Bearing Bronze 80-10-10-0 84- 8- 8-0
Bearing Bronze 83-7- 7-3 80-7-10-3
Composition "M" 88- 6-1½-4½ Cu-Sn-Pb-Zn
Ounce Metal or #1 Composition 85-5-5-5
Valve Composition 81- 3- 7- 9 Cu-Sn-Pb-Zn
Silicon Bronze
Underwriters' Mixture
Aluminum Bronze
High Strength Manganese Bronze
Regular Manganese Bronze
Leaded Manganese Bronze
Naval Brass 60- 1- 1-38 Cu-Sn-Pb-Zn
Leaded Yellow 70-1-3-26 66-1-3-30
Malleable Iron

Chart prepared by
Specifications Branch
Conservation Div., W.P.B.

SPECIFICATIONS					
ALLOY	ASTM	ARMY & FEDERAL	NAVY	AMS	SAE
Composition "G"	B 143, 1A & 1B B 30	QQ-B-691a - 5	46M 6g "G"	4845 A	62
Commercial "G"	B 143, 2B E-B 143, 2X	QQ-B-691a - 6	46B 5h "P-c"		
Composition "M"	B 143, 2A B 61	QQ-B-691a - 1	46B 8g "M"		
85-5-5-5	B 145, 4A B 62	QQ-B-691a - 2	46B23c "Ox-c"		40
81-3-7-9	B 145, 5A	QQ-B-691a -11	46B24d		
80-10-10	B 144, 3A			4842	64
84- 8- 8	E-B 144, 3Y	QQ-B-691a - 8	46B22d "II"		
83- 7- 7-3	B 144, 3B	QQ-B-691a -12			660
80- 7-10-3	E-B 144, 3X				
Naval Brass	B 146, 6C	QQ-B-621 - A	46B10f "N-c"		
70- 1- 3-26	B 146, 6A E-B 146, 6X & 6Y	E-QQ-B-621 X & Y	46B11 (Int.)		
66- 1- 3-30	B 146, 6B	QQ-B-621 - B	46B11 (Int.)		41
Silicon Bronze		QQ-C-593	46B28 (Int.)		
Aluminum Bronze	B 148, 9A & 9B	QQ-B-671a	46B18c		68
Underwriters' Mixture		WW-C-621a	34F 3c		
H. S. Manganese	B 147, 8B	QQ-B-726b B & C	46B29 "MA-c"	4862	
Regular Manganese	B 147, 8A	QQ-B-726b - A	49B 3e "Mn-c"	4860	43
Leaded Manganese	B 147, 7A	QQ-B-726b - D			

NOTE: *Specifications, as shown, are approximately equivalent but may not in all cases be interchangeable for procurement and inspection.*

February 1, 1943

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Special Resistance Welders

. . . . speed sheet metal fabrication work, afford rigid quality control

Fig. 1—Spot welding ordnance crates made from sheet metal. Two guns, each with two electrode tips, make four welds simultaneously under automatic control. Inset shows arrangement of electrodes

NOW THAT war production work has largely shifted from the tooling-up stage to the production stage, it has been possible to redesign many fabrications for assembly by resistance welding, thereby utilizing the high production capacities of resistance welding equipment. A few examples of such operations are shown here.

In Fig. 1 steel pieces made by simple blanking and flanging operations are being assembled to form a special crate. The unusual dual-gun upper arm is used in applying multiple spot welds simultaneously. Each of the two guns is equipped with two spot welding tips which make it possible for four welds to be made at a time, since both guns weld simultaneously. The electrode tips are advanced and held against the work by means of air pressure, a special device in each gun dividing the pressure on the work equally between the two tips.

In operation the parts to be joined are laid in position on the lower electrode which is wedge-shaped to present two flat surfaces 90 degrees apart to the work as can be seen in the insert in Fig. 1. As soon as the parts are in position, the operator trips the foot switch initiating the automatic welding cycle. First the air pressure is applied, advancing the electrode tips to the work. Then the automatic electric controls apply the required welding current for the desired time. Next the electrode tips retract and the work is redrawn for another set of welds.

As can be imagined, this setup has an extremely high production capacity. Output of three of these machines, with one operator for each, is approximately 125 completed assemblies per hour. Quality, too, is high for all conditions in welding such as electrode pressure, current and time are controlled and held automatically at the desired values once the control cycle has been set up.

Fig. 3 shows another high production setup for doing a similar job, utilizing special turntable fixtures and portable scissors type pinch guns, not shown. An assembled crate made in this equipment can be seen in the fixture at the right in the foreground, Fig. 3. Two welding guns are utilized on this job, one for each of the two fixtures at the right. The welding work is split up between two operators, each of whom makes a portion of the welds. The third and fourth fixtures are operated at the loading and unloading stations by two other workmen.

Mode of working this setup is as follows: Starting with one operator unloading a completed assembly and a second operator loading a fixture with parts for a new assembly and the two welding gun operators working, as soon as each welder has completed his job, the entire table tip is turned 90 degrees, advancing each of the fixtures to the next work station. Each of these crates requires 32 separate welds.

As can be seen from Fig. 3 the parts are assembled into the fixture for welding by inserting the corner channels into the upright guides, resting the cross members on top of these guides and clamping down the flanged-end plate with the hand screw at top of the pivoted cross bar forming part of the fixture.

It will be noted that each fixture is pivoted so that it is free to rotate on the table. This allows each fixture to be rotated independently and allowing each operator to handle his portion of the operation in the positions he finds most suitable without interfering with the work going on at the other three stations.

Rate of production with the setup in Fig. 3 is approximately 100 completed assemblies per hour when employing two welding operators and two other workmen at the loading and unloading stations. Thus, with this equipment and four workmen, the output is some 25 assemblies less per hour than the output of three of the machines shown in Fig. 1 where only three operators do almost exactly the same job. However, the output of the setup in Fig. 3 is much greater than that obtainable without the special fixtures.

On certain types of operations it is possible to equip the welding machine with a special shuttle-type fixture to speed the operation. Fig. 4 shows such a setup.

The item to be made is shown standing against the welder head at the right.

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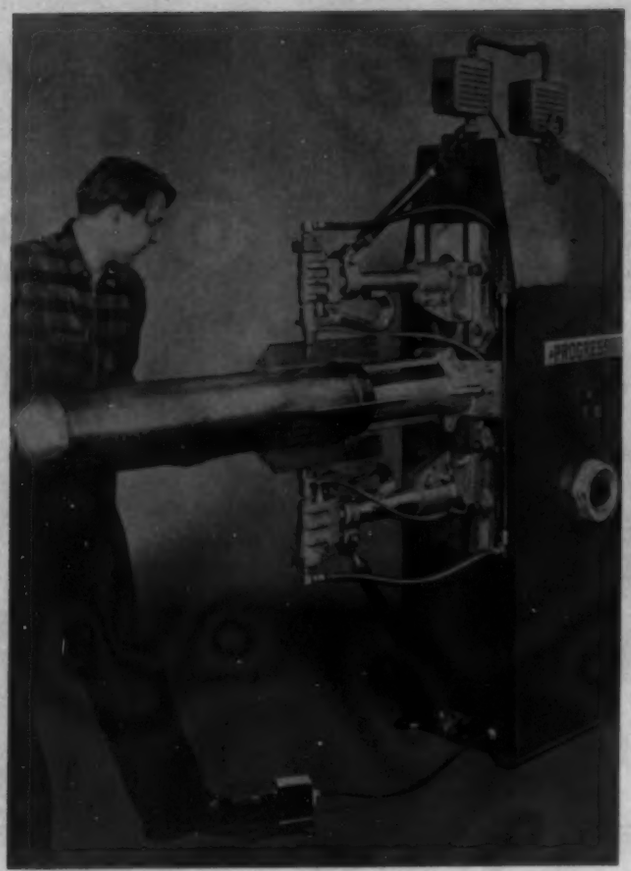

Fig. 2. (Above)—Upper and lower electrodes both move toward work held over mandrel to make two welds simultaneously. Automatic control repeats welding cycle continuously as long as foot switch is held down, providing rapid "stitching" action

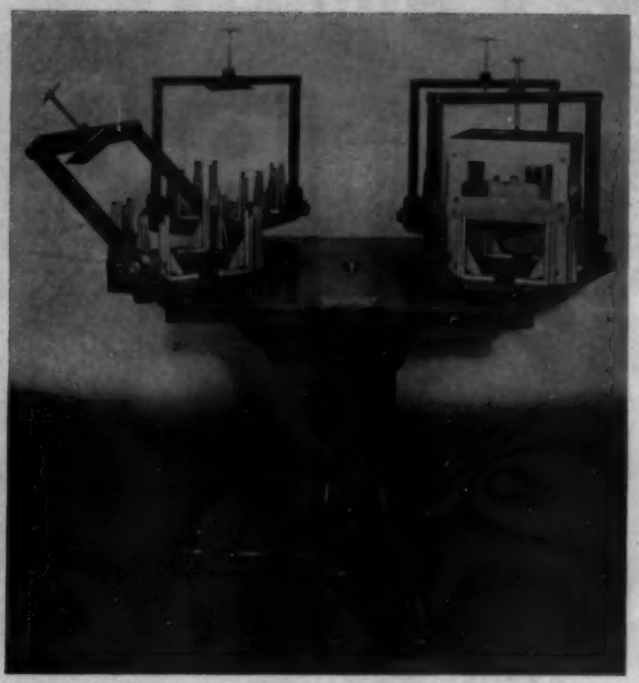

Fig. 3. (Above)—Top of this table revolves and each fixture revolves, affording two welding stations as well as an unloading and a loading station for assembly of crates similar to those shown in Fig. 1 but made using portable "pinch" guns

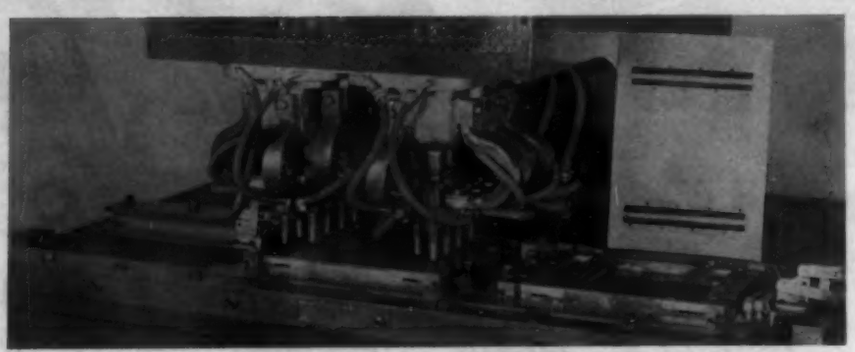

Fig. 4. (Above)—Here 16 welding electrodes make sixteen welds in rapid succession under full automatic control. Fixture is shuttle type, sliding work back and forth under electrodes. Photos furnished by Progressive Welder Co., Detroit

The operation involves welding two channel reinforcing sections to a flat plate. In Fig. 4 can clearly be seen the guide track and the shuttling mechanism by means of which it is possible to have one assembly underneath the electrode tips at all times while unloading and reloading the other portion of the fixture which shuttles back and forth under the welding head.

In operation the two channels are laid in position in the fixture and the flat plate is placed on top, being positioned accurately by stops at front, rear and ends. The stops at the end facing the other half of the fixture extend over the top of the sheet thus hooking over that end of the sheet and holding it down tightly in position on the fixture. The opposite end of the sheet is held in place by a cross bar on top and a quick acting end clamp.

With the fixture at the right as shown in Fig. 4, the operator drops the channels and box end in place and clamps it in position. The fixture then shuttles to the left bringing the work underneath the welding head where 16 welds are made automatically by initiating the welding cycle. Each channel is fastened to the plate by means of 8 of these welds. The 16 welding electrodes are advanced against the work and the required pressure maintained automatically by means of individual air cylinders which operate simultaneously from a master control valve connected to the automatic control mechanism.

While the welding cycle is being completed by applying the current in rapid succession from one electrode tip to the lower frame of the fixture in rapid succession, the completed work in the other half of the fixture is being removed and new parts assembled into position.

Now the fixture is shuttled back to the right and a second finished assembly removed and new parts put in place while the welding cycle is being repeated. Thus only two stations are necessary in this type of shuttling fixture, although there are two loading positions and one welding position. No time is lost in loading. The operator easily handles the loading and unloading operations at both ends of the work table. This particular production setup has an output of some 300 assemblies per hour. Three stations double shuttling setups are being utilized in a considerable number of resistance welding setups to speed operations.

(Please turn to Page 144)

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HEAT-TREATED PARTS BY TORCH SPOTTING

This discussion of torch spotting as a straightening method is Section III in a series of four articles on methods of controlling and correcting the distortion that occurs in heat treating certain types of parts. Section I, STEEL, March 15, p. 114, was devoted to oil-hardening steels; Section II, March 29, p. 74, to carburizing steels

By G. B. BERLIEN
Chief Metallurgist
Lindberg Steel Treating Co.
Chicago

The technique of applying the torch to the work is all-important in correcting distortion by "spotting". The torch should be brought to the work with a steady direct motion, and at right angles to the surface; held for about a second; withdrawn straight backward

ONE OF the newest straightening methods is the use of the acetylene torch for "spotting". This method originally came into use because conventional straightening practices were unsuited to certain types of parts. In recent years spotting has progressed to a point where it has replaced press straightening on a number of important applications. It is continuously finding a larger field as we become better acquainted with the technique of handling the torch.

Torch spotting is somewhat limited in the types of steels that can be handled successfully because of the ever-present danger of cracking due to the sudden application of heat on a hardened area.

Straight carbon steels respond most readily to torch spotting. Next in order are the deep-case low-carbon core carburized steels such as SAE-1020 and 1020-90. Steels of low total alloy, such as SAE-1315X, 3120 and 6115, also react well to this method. Thus it may be of value in working the new NE steels.

On carburizing steels, it is important that the case depths be 0.032 to 0.035-inch minimum on average sections, as parts having lighter cases will not react as well. Generally speaking the steel becomes more responsive to the torch as the case depth increases. Steels of higher carbon cores, such as SAE-3150 and 6140, require such intense spotting to move them that the softening effect jeopardizes the complete hardening job.

Classes of steels which move to a less degree than those mentioned above are the straight nickel, chromium-molybdenum and chromium-nickel-molybdenum, and straight chromium series (such as SAE-52100). Extremely difficult to straighten by spotting due to danger of cracking are the high-alloy tool steels such as high-carbon high-chromium, 18-4-1 and its relations as well as most of the oil-hardening tool steels. Also included here are the stainless steels.

Half the battle in spotting is to learn the correct technique for handling the torch. It should be understood that the surface of the steel actually struck by the cone of the flame is drawn considerably and therefore the point of application must be kept as small as possible. When no soft spots, however small, can be tolerated, it is obvious that spotting should not be used.

Spotting is always done on the high side of the warp. The work can be placed in centers or laid on a table. In applying the torch to the work, it is important that the flame be applied at a right angle to the surface. Hitting the part once at the highest point will ordinarily suffice to move an average section not exceeding 4 to 5 inches in length. The torch should be brought to the surface of the work with a steady, direct motion.

The time of application is usually about one second. The torch is then quickly withdrawn in a straight backward motion. A watersoaked rag applied to the spot prevents the area of the softened spot from increasing in size. Plunging the part into water is an alternate method of cooling. Then check to determine the amount of movement. If insufficient, the process is repeated, but at a spot approximately ½-inch away from the previous one. As experience with amount of movement to be expected for a given steel and section is accumulated, two or three spots can be made at one time.

To repeat: Application of the torch should be firm, well timed and at right angles to the work. The torch is almost never played over the surface. An exception to this is the practice of warm-

(*Please turn to Page* 140)

ORDNANCE QUALITY STEELS

Made by
DISSTON
in electric furnaces under tool steel practice

AIRCRAFT QUALITY....

Standard alloy steel for airplane parts, made to Disston's traditional standards of quality. The use of the purest obtainable materials—the careful segregation of scrap—the most modern practice under expert chemical and metallurgical supervision—these result in extraordinarily sound and clean steels in this classification.

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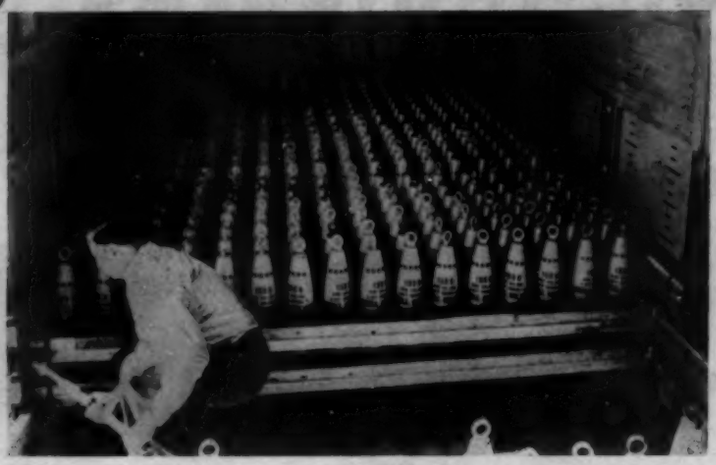
Standard alloy steel for gun barrels, rifle and torpedo parts and 37 m/m shot, produced in electric furnaces under precise controls. Experienced personnel and modern facilities achieve highly satisfactory results in the manufacture of this steel.

DISSTON ENGINEERS AND METALLURGISTS are always available for consultation and technical assistance on any problem concerned with the application of aircraft and gun quality steels. Address your inquiry to Henry Disston & Sons, Inc., 426 Tacony, Philadelphia, Pa., U. S. A.

• **The Army-Navy "E" has been awarded to the employees of Henry Disston & Sons, Inc., for high achievement in the production of war materials.**

—INCREASED PAYLOADS —DECREASED SHIPPING DAMAGE



. . . . . result from use of loader-equipped freight cars

(Continued from Last Week)

By E. S. EVANS
President
Evans Products Co.
Detroit

THE BUREAU of Industrial Conservation is stressing the conservation of critical and important materials. Much of this is now being used needlessly and uneconomically for dunnage in loading of freight cars. Some idea of this waste can be obtained from the following figures showing material used in dunnage for box cars in 1941: 325,700 feet of lumber, 27,740 tons band iron, 2,080 tons of nails and 10,570 tons of paper. A substantial increase above these figures took place during 1942 because of the increased use of dunnage due to heavier general loading and shipments of war materials such as shells, bombs, etc., which in an unequipped box car require 800 to 1000 feet of lumber per carload.

Crating and boxing in many instances, such as machinery and furniture, can be eliminated in the Utility loader car because: The load is held firmly; all slack is taken out; the load is tightened unit by unit; each unit is locked in place. Fig. 6 shows how lightly crated domestic water heaters and space heaters can be shipped with a minimum of packing material by means of a Utility loader. Table I shows comparative cost data on shipping four ordnance items by common and Utility loader cars. Note that savings in use of loader-equipped cars range from $53.54 to $106.45 per carload.

Flimsier shipping cartons because of defense restrictions are giving rail and truck lines a great deal of trouble. A doubling or even tripling of damage claims is expected to result. The loader reduces this hazard and permits important reductions in quantities of packing materials necessary.

These loaders used in federal arsenals for the intraplant movement of bombs and shells show savings in dunnage and its application ranging from $56 per carload for bombs to $106 per carload for shells, or an average of $75 per carload. Fig. 5 shows the cross members holding the first layer of such a load being tightened with a "persuader." Utility loader cars requiring only partial loading equipment are used to transport 500 to 2000-pound bombs.

Time saved in loading and unloading through elimination of milling, hauling, cutting and fitting of dunnage in box cars also is an important element in speeding up the flow of war goods. In government arsenals it was found that one-quarter of the loading time was saved on intraplant shipment of shells through dunnage elimination due to the use of the loader. A time study of a

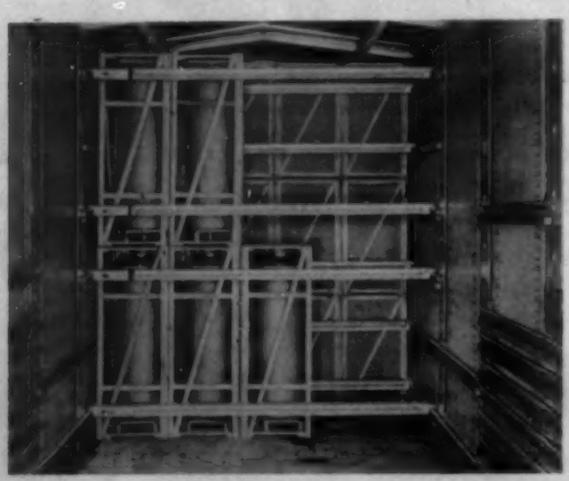


Fig 5. (Above)—Utility loaders are saving $75 per carload of bombs and shell as well as one-fourth loading time on loads like that shown. Operator is locking up a load of 155-millimeter shells here

Fig. 6 (Left) — Lightly crated domestic water heaters and similar products can be shipped with a minimum of packing material and with assurance against damage

PHOTO BY U. S. ARMY SIGNAL CORPS

OSTUCO "rides the dusty trails" with our mechanized Army

OUR all out Army is heading Hitler-wards on wheels because this war won't wait for movements afoot. Thousands of rugged American trucks transport men and materials over roads that are more often by-ways than highways.

In many of these military trucks, weight support and resistance to gruelling jolts and jars are supplied by parts made from OSTUCO seamless steel tubing. Among those parts are axles, propeller shafts and bearings, piston pins, washers and sleeves. For each application OSTUCO provides seamless steel tubing that meets strict military specifications—tubing that's straight, sound, clean, and free from pits, scores, and other surface imperfections.

Thus OSTUCO now draws on its years of experience to provide seamless tubing that fills the need for strength, hardness, accuracy as to size and gauge, and machinability to help solve vital wartime manufacturing problems. At the same time it is gaining a wealth of new experience to help you meet the new and equally strict demands of competitive, peacetime mass production.

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THE OHIO SEAMLESS TUBE COMPANY

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So take a tip from your competitors . . .

Whatever *your* requirements—quenching, tempering, machining or rust-prevention—there is a Cities Service product specifically designed to meet it.

Get in touch with your nearest Cities Service office now for quality petroleum products and expert lubrication counsel.

THE INDUSTRIAL HEAT PROVER

The Cities Service Industrial Heat Prover enables those engaged in the oxygen control of furnace atmospheres to achieve certain physical results desired in the processing of metal, or in the control of the amount of combustibles present. Recordings are continuous and almost instantaneous. If you are not already familiar with this instrument and the outstanding service it is now performing for industry, write for a completely informative booklet to Cities Service Oil Company, Room 1345, Sixty Wall Tower, New York, N. Y.

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Fig. 7—Heavy, bulky and irregular shaped objects are easily handled by the loader system as shown here. Often the car requires only partial loading equipment for such items for their weight may make a single layer all that the freight car will carry

TABLE I—Shipping Cost Data

	Common Car	Utility Loader	Remarks
Shells (With Grommets)			
Lumber storage (est.)	$ 1.50	None	
Milling of lumber (est.)	13.70	None	4 hrs. @ $1.625 carpenter 8 hrs. @ $0.90 helper
Loading labor (est.)	*59.75	†$33.75	*16 hrs. @ $1.625 carpenter †*45 hrs. @ $0.75 loader
Loading dunnage: (A) Lumber	31.50	None	700 bd. ft. @ $45 M
(B) Nails	1.00	None	
Freight on dunnage (weight)	18.38	None	1470 lbs. @ $1.25 C
Unloading labor	12.00	12.00	16 hrs. @ $0.75
Totals	$137.83	$45.75	
	—45.75		
Saving	$92.08		
Shells (Without Grommets)			
Lumber storage (est.)	1.75	None	
Milling of lumber (est.)	15.41	None	4.5 hrs. @ $1.625 carpenter 9 hrs. @ $0.90 helper
Loading labor (est.)	*63.00	†33.75	*18 hrs. @ $1.625 carpenter †*45 hrs. @ $0.75 loaders
Loading dunnage: (A) Lumber	37.13	None	825 bd. ft. @ $45 M
(B) Nails	1.25	None	
Freight on dunnage (weight)	21.66	None	1733 lbs. @ $1.25 C
Unloading labor	12.00	12.00	16 hrs. @ $0.75
Totals	$152.20	$45.75	
	—45.75		
Saving	$106.45		
Bombs (With Shipping Pedestal)			
Lumber storage (est.)	1.00	None	
Milling of lumber (est.)	10.28	None	3 hrs. @ $1.625 carpenter 6 hrs. @ $0.90 helper
Loading labor (est.)	*20.13	†12.00	*5 hrs. @ $1.625 carpenter †*16 hrs. @ $0.75 loaders
Loading dunnage: (A) Lumber	23.04	None	512 bd. ft. @ $45 M
(B) Nails	1.00	None	
Freight on dunnage (weight)	13.44	None	1075 lbs. @ $1.25 C
Unloading labor	12.00	12.00	16 hrs. @ $0.75
Totals	$80.89	$24.00	
	—24.00		
Saving	$56.89		
Fiber Pack Ammunition			
Lumber storage (est.)	1.00	None	
Milling of lumber (est.)	11.98	None	3.5 hrs. @ $1.625 carpenter 7 hrs. @ $0.90 helper
Loading labor (est.)	*18.50	†12.00	*4 hrs. @ $1.625 carpenter †*16 hrs. @ $0.75 loaders
Loading dunnage: (A) Lumber	21.25	None	450 bd. ft. @ $45 M
(B) Nails	1.00	None	
Freight on dunnage (weight)	11.81	None	945 lbs. @ $1.25 C
Unloading labor	12.00	12.00	16 hrs. @ $0.75
Totals	$77.54	$24.00	
	—24.00		
Saving	$53.54		

farm equipment load showed 63 man-hours saved on cutting dunnage, nailing and bracing, independent of loading the commodity itself.

In 1941, the hauling of lumber, band iron, nails and paper to shippers for use as dunnage in box cars required 16,919 carloads. Car loadings for this purpose are on the increase due to the new volume of traffic and heavier general loading.

An average of 7 man-hours per trip is required to prepare a car for its next load. At the rate of only 20 trips per annum, this would represent approximately 15,000 to 20,000 cars out of service all the time because of cleaning. The detention time consumed to clean cars of ordinary dunnage is bulked up 10 or 20 times by spilled liquids, oil and grease which permeate box cars. To remove spots and deodorize the cars for subsequent shipments, particularly of food products, it is often necessary to scrape car floors.

The loader helps do away with spillage and breakage by holding the load firmly, thus preventing shifting in transit due to vertical vibration. The elimination of this loss of time in taking care to and from the rip-track and cleaning them will contribute approximately 9000 box cars to active service.

Flexibility: The Utility loader car is even more flexible than a common box car. It will not only haul fragile or cumbersome loads economically, but it will secure "greased pig" loads such as gas tanks (which have been known to roll from a box car) or other loads hard to fasten and block. Grain, flour, cement and other bagged materials are easily handled in these cars. Because of its flexibility, such a car can be used readily in two-way operation.

(*Concluded Next Week*)

Oil Absorbing Floor Cleaner Is Fireproof

Fibre-Tex, a new fireproof oil-absorbent sweeping compound said not to burn when the flame of a blowtorch is played directly upon it, is announced by Lacey-Webber Co., Kalamazoo, Mich. Besides being an oil and grease absorbent it provides an active cleaning effect upon floors on which it is consistently applied. Grease and oil-caked dirt are said to be removed; safety stripes and other floor markings made plainer.

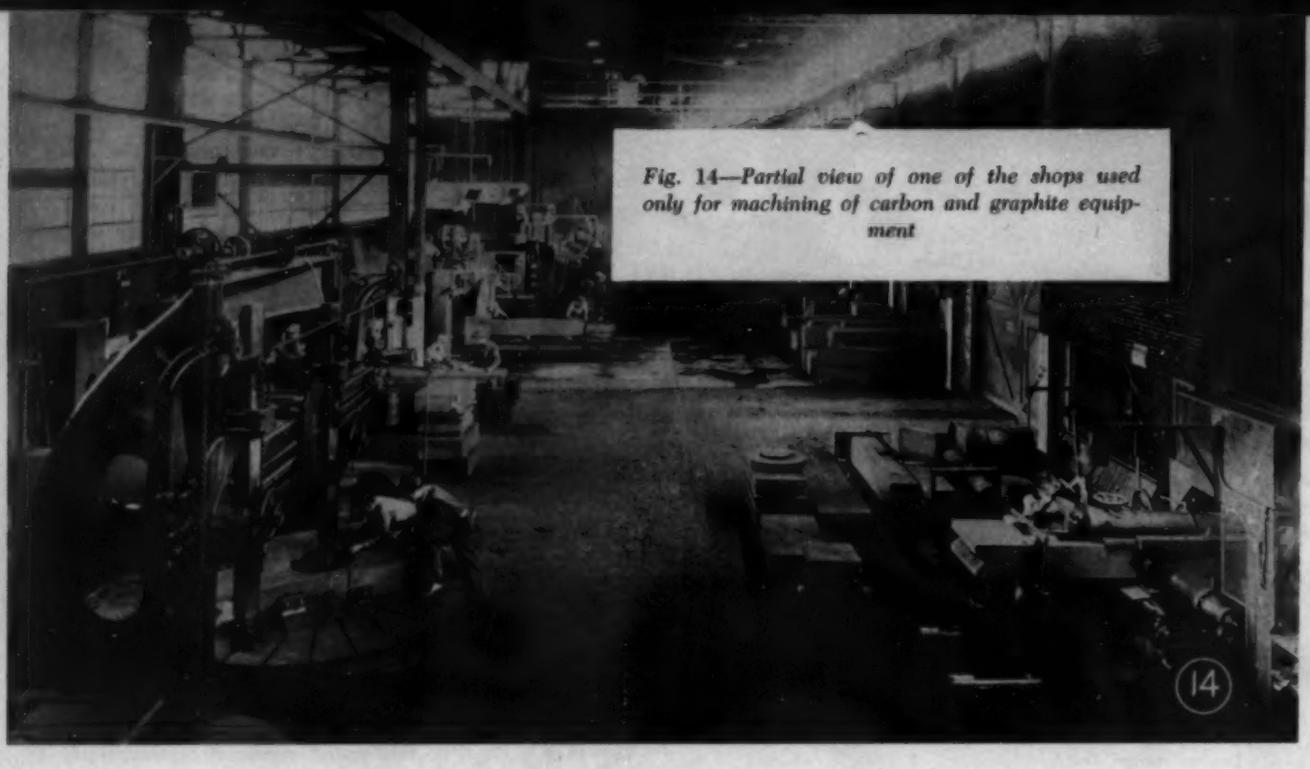


Fig. 14—Partial view of one of the shops used only for machining of carbon and graphite equipment

CARBON

A Refractory Material

By FRANK J. VOSBURGH
Manager, New Products Division
National Carbon Co. Inc.
New York

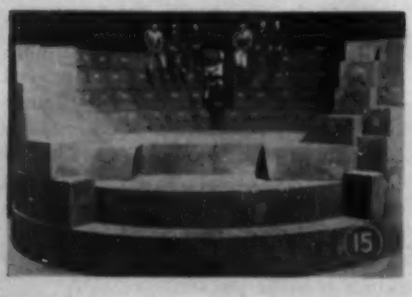
(Continued from Last Week)

CARBON BLOCKS for furnace lining purposes are made in practically all the sizes in which square or rectangular electrodes are made, and range from a few inches wide and a few feet in length up to 16 x 16, 20 x 20, 24 x 30, and 15 x 30 inches in end section, and lengths up to 15 feet. The smaller the cross section the shorter the block in general as small cross section abnormally long blocks are difficult to keep straight through the various manufacturing processes, particularly the baking. The manufacturing process is identical with that used in producing carbon electrodes except that since blocks do not have to meet as strict specifications as electrodes as to shape and size and since usually electrical resistivity is not important, less expensive materials can be used. Carbon blocks as a result sell at a lower base price than the more carefully fabricated electrodes.

In designing any carbon lining, attention should be given to using blocks of standard sizes, that is, sizes for which the manufacturers have the dies and which they can produce readily. Special sizes are costly and take much longer than normal to produce. Another point to keep in mind is that a double layer of blocks with staggered joints is usually a better proposition than a single layer. For example, two layers of 15-inch thick blocks are better than a single 30-inch layer, largely because it is not generally possible to give to the tamped paste in the joints the uniformity and density normally found in the prebaked blocks.

The life of a carbon lining in any type of furnace is indeterminate, since it is affected by many things. The type of product has an effect in more than one way, for some products have to be smelted at higher temperatures than others, one product may be more liquid than another, and therefore harder to hold, while the carbon demand of one product may be more easily satisfied than that of another and so may not attack the lining as quickly. Proper design is an important factor, as is the prevention of air infiltration, and proper operation of the furnace is perhaps the most important of all. Probably a life of between two and five years is average.

Graphite is easily machinable, and



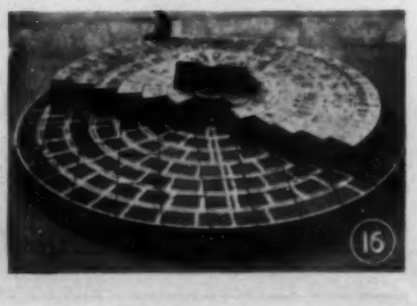


Fig. 15. (Left)—Rectangular base blocks and first layers of radial blocks for hearth of carbon-lined blast furnace

Fig. 16. (Right)—Sectionalized view of carbon hearth and crucible set in blast furnace using large base blocks and smaller blocks

A SMALL FURNACE WITH BIG QUESTIONS

- ★ What type of refractory should be used?
- ★ What effect will slag have upon the refractory lining?
- ★ How can the refractory be protected against erosion?
- ★ How can the load-carrying ability of the floor brick be judged?
- ★ What will be the heat losses due to periodic operation?
- ★ What is the best type of arch or roof support for this furnace?
- ★ What precautions should be taken against the effects of expansion and contraction?
- ★ Will heat losses through the structural steel be great? How can they be minimized?
- ★ Should the brick be laid with a heat-setting or an air-setting mortar?
- ★ What type of wall anchoring, if any, is most suitable?
- ★ What protection, if any, should be provided against flame impingement?

B&W Refractories Engineers Answer Questions Like These Every Day.

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B&W Refractories Engineers are qualified to give advice on furnaces like the one illustrated, or on stress-relieving units that employ as many as 80,000 B&W Insulating Firebrick. Their advice is free and without obligation.

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parts requiring involved or complicated machining should be made of that material unless its high heat conductivity and greater electrical conductivity preclude its use. Graphite can be worked easily on any equipment that is used in metal working, and much work can be done on it in standard woodworking equipment. Carbon can be machined on most metalworking tools, but with greater difficulty, and because it is apt to be slightly abrasive is practically never worked on milling equipment or with hobs. Lathes, planers, grinders, and particularly diamond and abrasive type saws are used in working carbon. Though in general graphite costs twice as much per pound as carbon, if the part requires much machining, it is cheaper to make it of graphite because of the higher cost of the carbon machining. (Fig. 14)

Used in Blast Furnace

An application of carbon as a refractory, which in Europe for years has found general favor but which in the United States is slowly gaining recognition, is the lining of blast furnaces. Originating in Germany in 1886 but now prevalent in England, Belgium, Sweden, Russia, and Italy, carbon has proved a superior lining material for certain portions of a blast furnace.[2] [4] [5] [6]

As previously indicated carbon retains its strength at temperatures far above those found in blast furnace operations, is not attacked by the molten iron since the metal is already carrying a maximum amount of carbon, and is not affected by the slags. These facts plus probably two others in the beginning, one, that German refractories are not as high in quality as are used here, and two, that German ores are much lower in iron content than American ores, with consequent larger slag volumes, encouraged the trial of carbon in spite of its higher cost. Disregarding many failures the use increased until a large part of foreign iron is produced in carbon-lined furnaces. Carbon linings are used only in the hearth and tuyere sections and up to the mantle. Where used, what free oxygen there is, or any carbon dioxide, are quickly taken care of by the more easily available incandescent coke carbon.

Theoretically at least, a properly installed carbon lining in a blast furnace should last indefinitely, and there should be no salamander. The carbon per ton costs several times as much as the ceramic brick and blocks generally used, but that differential should be more than offset by:

1. Easier and more rapid installation.
2. Presumably much longer life.
3. No salamander to remove, an expensive, dangerous, tedious affair.
4. No cooling plates to install and maintain.
5. Easier removal when the furnace finally is torn down.
6. Probably considerable salvage value.

Fig. 17—Cottrell precipitator towers. Left hand tower of carbon construction; right hand tower of chemical brick construction

No blast furnace in the United States has had a complete carbon lining installed, that is, hearth section and up to the mantle, but many operators are showing considerable interest in the subject, and a few are trying out carbon in an experimental manner in patches or repairs so that perhaps after the war ends, some concern recognizing the advantages of carbon as a blast furnace refractory, will have the courage to try it out. A lining up to the mantle for a 1000-ton per day furnace, would require the production of 1,500,000 pounds of carbon. See Figs. 15, and 16.

Because the temperatures in electric steel furnaces vary in short cycles over an unusually wide range, with a high maximum, some of the characteristics of carbon would seem to make it an ideal lining material. Unfortunately some of carbon's other attributes are not so satisfactory.

The worst characteristic is that both carbon and graphite oxidize at relatively low temperatures, and the atmosphere in an electric steel furnace is almost always oxidizing. Much experimental work has been done trying to use carbon in electric steel furnaces, and a few operators do use carbon brick at times in certain extremely bad spots.

A German article [7] published in 1936 reports that 24 heats were obtained from a carbon roof of an electric steel furnace, compared with 29 heats for silica brick. The same article mentions 80 to 100 heats from a furnace roof of a small acid lined electric furnace.

Probably the most authoritative evidence on this application of carbon is contained in a *Stahl und Eisen* report of September 1932 by Dr. Franz Sommer. [8] The report concludes:

"The results of the tests with carbon roofs may be summarized as follows:

The possibility of insulating an electric furnace with carbon roof against heat

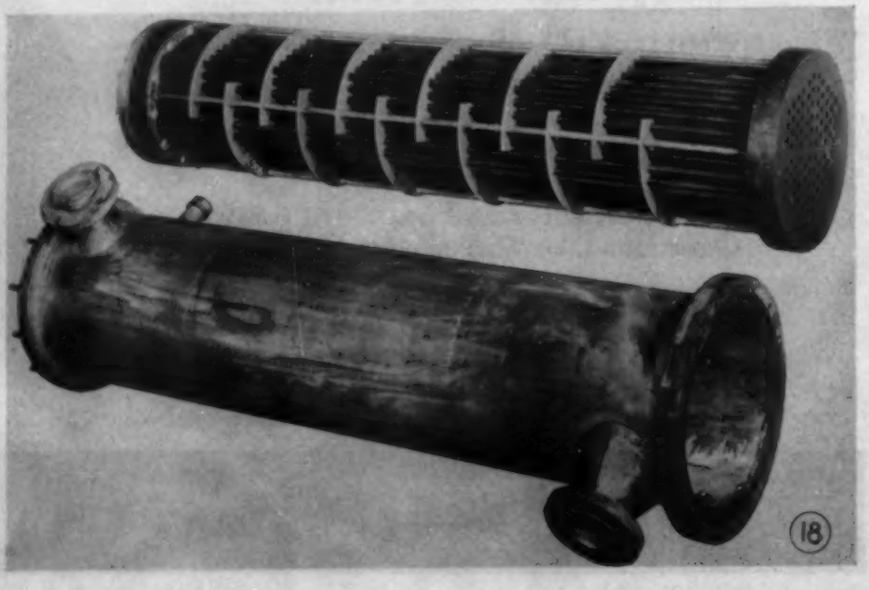

Fig. 18—Karbate (impervious graphite) heat exchanger bundle tubes, 1¼ inches outside by 9 feet long; tube sheet 24 inches diameter

Ignition Furnace for continuous type Sintering Machine. One of McKee's specialized features.

Ore Beneficiation

McKEE engineering for ore beneficiation is based on sound fundamental knowledge of the problems and requirements of the blast furnace operator as well as the ore producer.

McKee engineering, from mine to finished product, takes into consideration all chemical and physical factors of your raw material in designing ore treating plants to produce results to meet your exact requirements.

Thirty-six years of designing and building for the iron and steel industry have built a valuable fund of McKee experience which is available to you through this organization.

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CAN BE FIRED WITH COKE GAS, NATURAL GAS, BLAST FURNACE GAS, FUEL OIL, PRODUCER GAS, OR A COMBINATION OF ALL THESE FUELS.

Other Advantages too:

★ **Increased Ingot Yield**—Safe firing at maximum rates permits maximum speed in heating steel. One-way pit arrangement doubles ingot capacity for given floor area.

★ **Steel Quality Protected**—Flame travels across top of ingots, not directly against them. Pit temperatures are uniform and accurately controlled. No burned ingots.

★ **Fuel Economy**—Scientific burner design, preheating of air, efficient flame travel, automatic control, adequate pit insulation produce maximum firing efficiency and minimum fuel consumption.

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Seeing is believing. We invite you to convince yourself that SC one-way pits can speed up your own ingot production, safeguard steel quality and save you money.

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● Those four words often spell the difference between success and failure. When experts solemnly declare "You can't do THAT!" many people "fold their tents as the Arabs and silently steal away." But to the Spriesch Tool & Manufacturing Co., Inc. it's a challenge—a challenge to our ingenuity.

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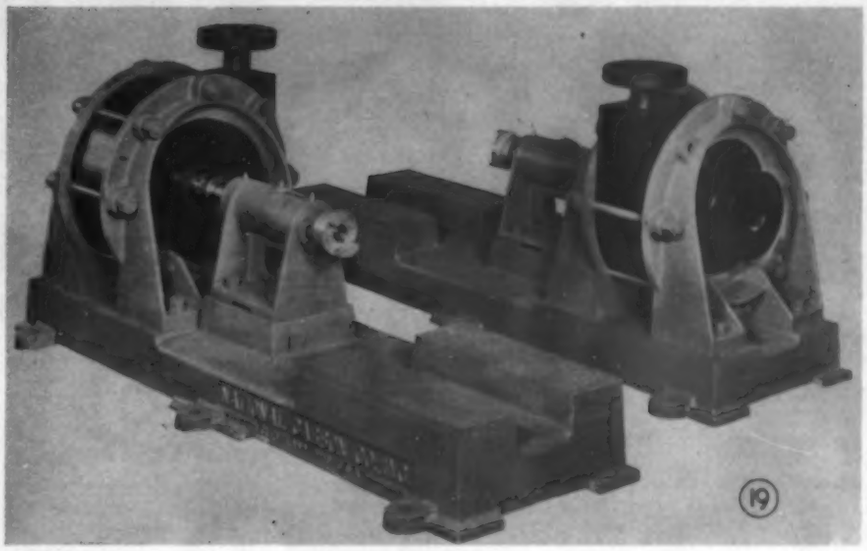
Fig. 19 — Karbate (impervious graphite) pump



losses would lead one to expect a notable saving of energy. In continuous operating, however, these savings would be nullified by the high repair costs.

The life of a carbon roof is determined by the wasting away caused by oxidation. A loss of 1 millimeter (0.04-inch) per operating hour may be assumed, so that a roof 400 millimeters (16 inches) thick, for example, may last 50 to 60 heats. If, at the same time, we consider the economies of carbon blocks as against silica bricks, there seems at the present time little promise in further tests of this material."

The tests were made on a 9½-foot diameter (2910-millimeter) shell furnace using 15-inch (380-millimeter) diameter electrodes. The roof blocks were 6.4 inches square (160 millimeters) by 12 inches long (300 millimeters) and the roof was protected by 1.2 inches (35 millimeters) of fire clay mud and 3.2 inches (80 millimeters) of diatomaceous earth blocks. Oxidation was at the rate of 0.03-inch (¾-millimeter) per hour of melting. A tamped paste roof was tried with less success, the rate of oxidation being 0.04-inch (1 millimeter) per hour of melting. One of the chief difficulties encountered was with the silica brick used in rings around the electrodes to insulate them from the roof. The silica brick lasted about six heats and are presumed to have failed, "because of the high roof temperature and perhaps also because of the reducing effect at the contact surface between the silica and carbon. The same strong disintegration occurred at the door arches. These too had to be renewed after each 10 to 12 heats."

The steel industry too has found in carbon a material that solves many of its problems in spite of the fact that the material does oxidize at relatively low temperature (350 degrees Cent.; 662 degrees Fahr.) for carbon and 450 degrees Cent.; 842 degrees Fahr. for graphite. Regardless of that weakness carbon is a refractory material and when it does fail it is usually consumed and so does not add to the impurities in the metal. Carbon mold plugs, unheard of but a few years ago, are now being purchased in carload lots, and are gradually replacing both metal and ceramic plugs. The carbon plugs cost more than the ceramic grades, but that is offset by the fact that the carbon plugs generally can be used several times. Carbon bricks are being used in runout troughs by a number of blast furnace operators, and with success. The carbon is not wetted by the metal or the slag, so they do not stick to the carbon bricks as they do to clay bricks. As a result a disagreeable job is made a little less unpleasant.

Graphite molds have been used experimentally for many purposes for years, but at present a number of concerns use them as production equipment. Practically all the machine tool and special metal bits for oil well drilling are cast in graphite molds, for this is the only material that will stand the heat shock of the high temperature used, and it can be machined economically. Other concerns are using graphite molds for casting both ferrous and nonferrous ingots. Fig. 20 shows a graphite mold that has been used several thousand times in the nonferrous industry as compared with the less than 200 pours obtained with metal molds. The higher cost of graphite is offset by the extended service obtained, plus a more satisfactory finish on the product.

From one customer who has used graphite stools over a considerable period in the nonferrous field, has developed a continually growing list of both ferrous and nonferrous concerns that have appreciated the characteristics of this material that make it especially adapted to that usage.

Refractory usage of carbon in the metallurgical field is centuries old and usage in the chemical field is not new, but the last decade has seen so tremendous an expansion of the latter that it is becoming the more important application. Carbon and graphite are used in the forms in which they are produced, and are merely fabricated to fit the application, or they are specially treated and thus made completely impervious, in which form the fields in which they can be used are enormously enlarged.

The use of carbon brick for lining tanks, vats, etc., particularly pickling tanks wherein stainless steel is pickled, has been fully described by others but it should be remarked that such usage is increasing as the excellent corrosion-resisting qualities of carbon find greater recognition. [9] [10]

A relatively new application for carbon and one that has had a hothouse forced growth as the result of the war, has been the use of carbon blocks and slabs in the construction of Cottrell precipitators. Carbon tubes have been generally used in that type of equipment for 15 years, when handling phosphoric or sulphuric acids, and nearly that long ago carbon blocks were used in the tower construction in connection with

(*Please turn to Page* 146)

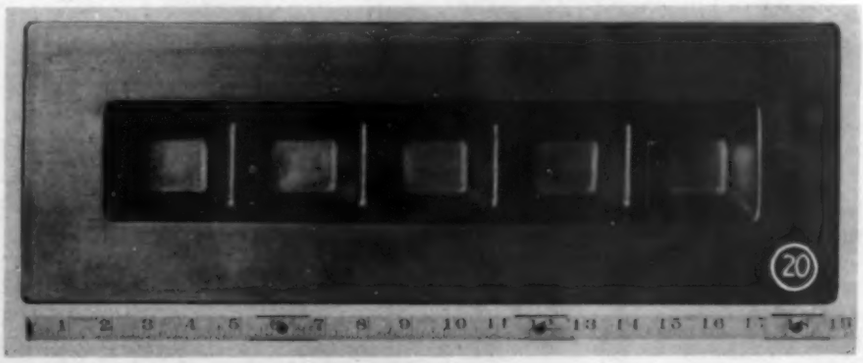


Fig. 20—Graphite ingot mold

How To Arrange

WORKING SHIFTS

For Maximum Production

TIME CHARTS that place workers by age groups in shifts to use their cycles of body strength to best effect have been worked out by a noted physiologist and published with the approval of the Division of Labor Standards of the United States Department of Labor. Frequent shift rotation, it is pointed out, is hard on workers and retards their productiveness.

Facts developed by Dr. Nathaniel Klietman, associate professor of physiology, University of Chicago, are summarized as follows:

If you look at a clinical or fever thermometer you will notice an arrow at the 98.6 degrees Fahr. mark. All the lines above that mark are in ominous red. These markings have created the utterly false impression that the normal temperature is something very constant. Actually, it is no more constant than, for instance, the pulse rate; the two, incidentally, vary in the same manner.

Instead of a normal body temperature, we have a temperature range varying for different people and for the same person at different times. It amounts to about 2 or 3 degrees Fahr. over a 24-hour period, and the variation in body temperature from hour to hour is such as to create what we call a 24-hour body temperature curve.

Under ordinary routine conditions of existence, the peak or plateau of the temperature curve is reached some time during the afternoon, usually between 1 and 7 p.m. At that time our efficiency is greatest. The low level of body temperature is reached during the early morning hours, somewhere between 2 and 5 a.m. If a person stays awake overnight, those are the hours of greatest inefficiency and greatest difficulty of remaining awake.

When a person adjusts himself to a new routine of existence with other than customary hours of sleep, work, meals and leisure, he gradually acquires a body temperature curve with highest efficiency and less sleepiness during the activity hours and just the opposite during the new sleeping hours.

It takes several weeks for a new 24-hour sleep-work-meals leisure cycle to be properly established. Such achievement is wholly impossible under the system which prevails in shift rotation because the individual is not given a chance to adapt himself to a new routine. He essentially remains on the customary cycle of day-time work and night-time sleep.

This makes him dislike work at odd hours. It causes him to be sleepy at a time he should be wide awake and wakeful when he should be sleeping; it leads to a decrease in production rate and a greater tendency to accidents.

The way to overcome this effect is to keep each worker on a given shift for extended periods of time.

Since rotation of shifts is very often adopted as a measure of fairness to all workers, the principle can be preserved by having the workers change shifts once in several months instead of weeks or even days.

The change in shifts can be staggered and made to coincide with short periods of vacation, in line with the suggestion that vacations should be distributed around the entire calendar year, instead of concentrated during the summer months.

Where the workers themselves prefer it, the maintenance of steady shifts with no rotation whatsoever can be accomplished with due regard to seniority rights.

Whether the shifts are steady or rotated, some effort should be made to modify community life to the extent of making leisure at other than customary hours. For instance, broadcasting companies might be induced to make transcriptions of their popular evening hour programs for rebroadcast during the afternoon and late night hours. Moving picture shows could be extended either way by a few hours, and parties, meetings and lectures organized with an eye to the leisure hours of each third of the working population.

Timing of the Shifts: There's a name for those hours from midnight to 8 a.m.—the graveyard or lobster shift. This work period just about matches most people's sleep period. A person could adjust himself to a different timing of shifts if the displacement cycle were smaller. For instance, where the plant runs on three 8-hour shifts, the timing of shifts shown on the charts is suggested.

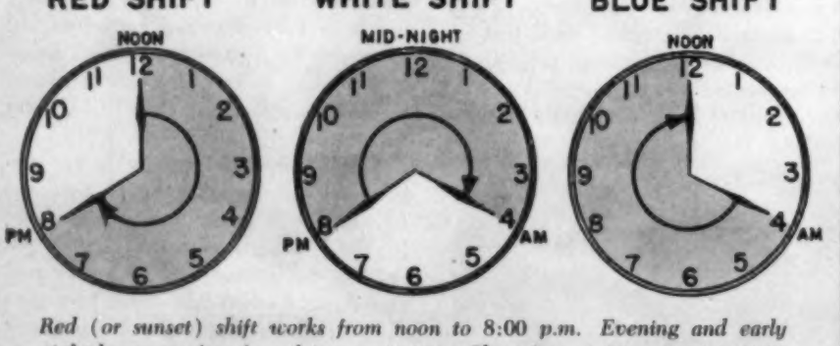
This shift timing has a number of advantages. One of the distinct advantages is the relatively small displacement of the customary sleeping hours, and no one is compelled to sleep in the afternoon hours, when it is hardest to sleep. Another advantage is that it also makes shift changing fall at hours which are not general community rush hours. If several plants are located in the same vicinity, the transportation problem created may require the shift changes to be staggered.

The special advantages of these shifts lie in their appeal to certain groups of workers divided according to age, interests, family status and recreation habits.

For Various Family Needs: The Red shift will appeal to young unmarried men and women who like to have their

(Please turn to Page 150)

From *Supervision*, 95 Madison avenue, New York.



Red (or sunset) shift works from noon to 8:00 p.m. Evening and early night hours are free from leisure activities. Sleep from 1:00 or 2:00 to 9:00 or 10:00 a.m.

White (or victory) shift works from 8:00 p.m. to 4:00 a.m. Sleep from about 5:00 a.m. to 1:00 p.m. Afternoon and early evening free for leisure

Blue (or dawn) shift works from 4:00 a.m. to noon. Leisure period in the afternoon. Sleep from about 7:00 p.m. to 3:00 a.m. This shift system disturbs normal hours as little as possible

DOWNED! BY THE 17,901st?

GUNS BLAZE in the dark sky. That boy up there trusts his own skill and courage—and the many thousands of metal parts that keep his plane strong and flying against heaviest odds.

What if some tiny part *we* helped to make turns traitor in mid-battle?

If we could only see those tracer bullets sow red death across the cockpit, feel with him his sharp and lonely peril in the sky . . .

We'd say, "Our pay is still the comfort of our homes; his pay hot lead, night battles, chance of flaming death."

We'd say, "If we don't give the best we've got, our smallest failure is a crime against the life he scarcely lived and gladly risked for us."

And so we pledge: to make each metal part that keeps him fighting *true* to the minutest fraction; to conserve our metal; to work with our best skill; to think with precision; and so keep faith with those who do our fighting.

In this spirit, we at R B & W pledge ourselves to strength and accuracy in the millions of Empire bolts and nuts that we are making to hold American war equipment together. To R B & W's special manufacturing processes, developed through the years, we add the personal energy and care that forms an essential part of R B & W's contribution to Victory.

Reproductions of this ad re-arranged with a slogan for your War Production Drive, are free, upon request. Write Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

RB&W *Making strong the things that make America strong*

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

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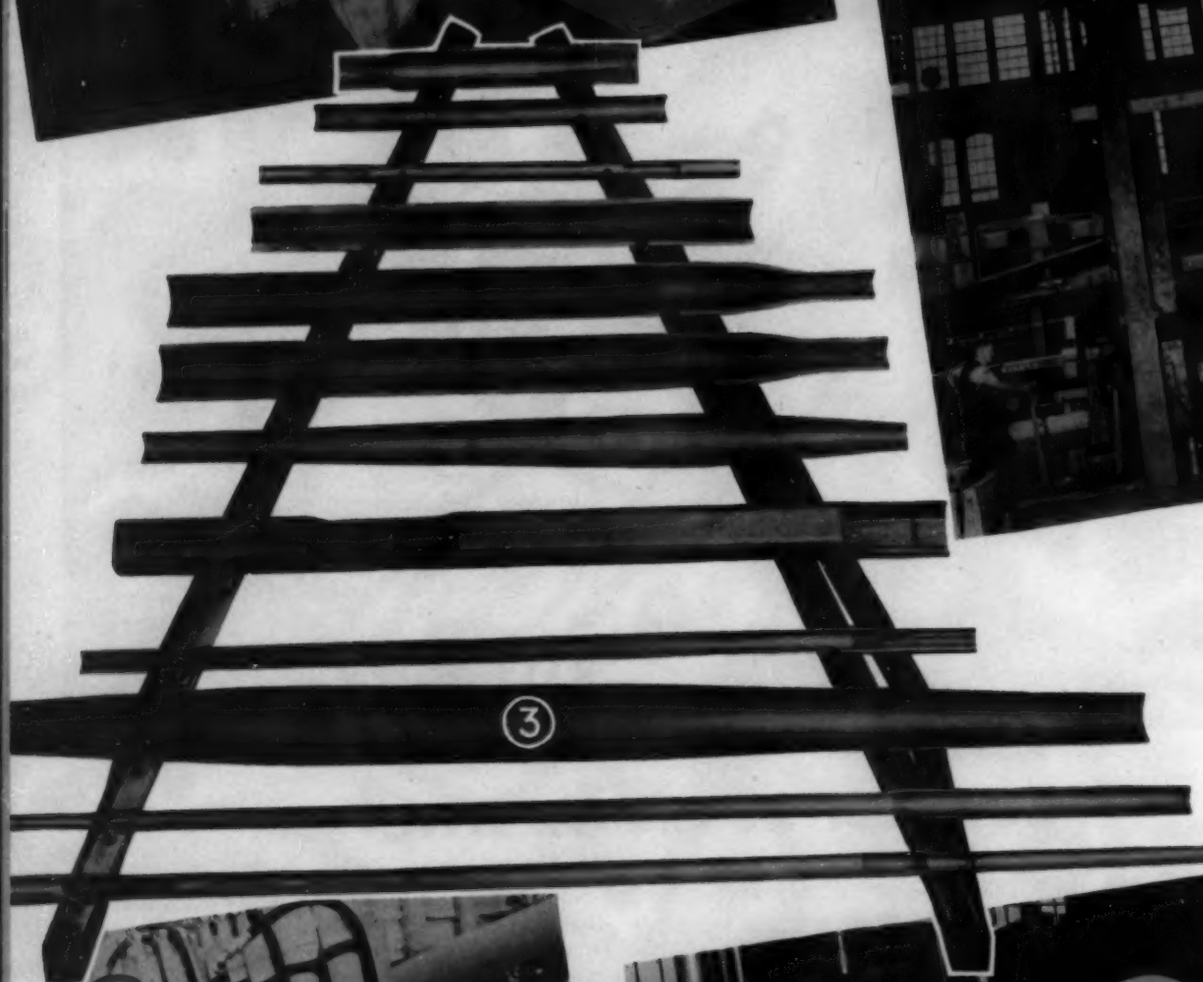
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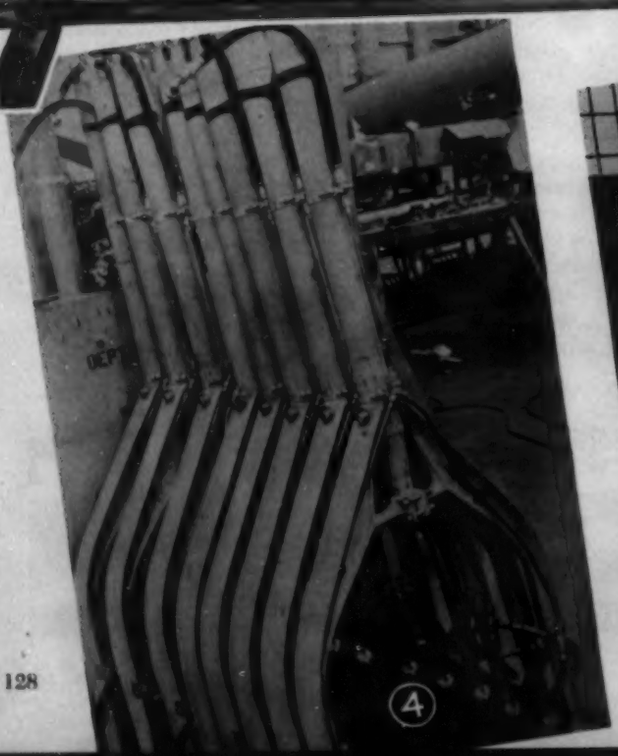
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subcontracting

—increases output of tube mill 500 per cent
—enables mill to expand its service to customers
—puts otherwise idle facilities into vital war production work
—on one item alone saves 22 per cent in material, enables closer tolerance control, keeps rejections below 1 per cent, releases critical equipment in the mill for production of special parts

By D. E. LUKENS
Summerill Tubing Co.
Bridgeport, Pa.

BEGINNING in the fall of 1939, the greatly increased demands for tubing, particularly aircraft tubing, necessitated round-the-clock operation at Summerill before mid-October of that year. Until this time output at this plant had been primarily straight tubing. But requests to produce more finished and semifinished parts to aid in the relief of our customers' fabricating and machining facilities began to roll in.

This unexpected change in customers' requirements caused an entirely new production, for no facilities were available for certain operations and present facilities were not sufficient for other operations.

This situation necessitated the immediate investigation of possible subcontracting facilities in the Philadelphia-Norristown-Bridgeport area. The result is that Summerill has developed a roster of subcontractors who are performing varied operations including machining, swaging, heat-treating, straightening, cutting, reaming, plating, tumbling, forming, sand blasting and grinding.

Through the judicious use of these many services, Summerill has been successful in greatly expanding its own production as well as performing additional services to customers and relieving facilities in crowded areas.

Of equal importance, it has been possible through taking advantage of the local facilities to develop and produce many special tubular parts for aircraft, giving a better weight-strength ratio. This is especially true for tapered and heavy-end tubes, some of which are illustrated in the following text.

Machining: Although most of Summerill's semifinished parts only require outside machining, the machining and setup technique necessary on tubing is quite different and usually more difficult than solids. Machining hard alloy steel while maintaining uniform walls and concentric diameters requires special care and tools.

It was therefore necessary to develop machining sources of unusual dependability. Machine operators and foremen must be properly schooled so as to ensure that the parts are efficiently produced to the close tolerances required. Considerable difficulty was experienced in developing satisfactory sources with the facilities and manpower necessary to meet the required tolerances.

In the early stages instances of poor work and excessive rejections were frequently encountered. But with patient weeding out and close contact and control on the part of our inspection department, several dependable and satisfactory shops were developed.

As some instances of performance, many hundreds of parts requiring an intricate tooling technique have been produced in one shop to such a fine quality that our inspection department has not rejected one part in more than five months of continuous operation. In another instance, a shop has produced 75 to 100 heavy special sections weekly for more than two years without a rejection.

Although results, as a whole, are now quite satisfactory, strict control and constant vigilance must be maintained by our inspectors. But results certainly warrant the effort and have proven well worthwhile.

Reduced Ends of Heavy Walled Sections: Probably the most interesting phase of Summerill's subcontracting efforts has been in the production of this type of part.

A graphic example is the rear strut brace shown in Fig. 4. This part was developed in co-operation with our customer's engineers nearly two years ago, and for many months required production was handled on our own equipment. But suddenly demands for this part were stepped up 500 per cent. This presented a tough situation, for the equipment necessary for this part was also being utilized to produce heavy bomber parts. Delivery of additional equipment could not be obtained quickly. We were informed that other tube mills had turned it down, "so it was our baby."

One of our men had been waiting for

Fig. 1—Closeup of special setup devised by Davis Machine Co., Phoenixville, Pa., (a Summerill subcontractor) for the final facing operation on part No. 490 (Fig. 6). Object is to obtain accurate length and square ends. Note automobile gear shift

Fig. 2—This compression testing machine at Lehigh University now does production work in forming part No. 467. See Figs. 3 and 4

Fig. 3—Typical tubing sections produced by Summerill and its subcontractors. Starting at top: Machined outside and inside diameters, upset inside diameter on one end; straight outside diameter and stepped walls; straight outside diameter and tapered inside diameter; part No. 467 after machining with heavy walls left only where needed, shown also in Fig. 4; part No. 467 before machining; note wall thickness in long portion has not yet been reduced by machining; straight taper in both directions; stepped wall, square section; stepped wall, straight outside diameter with one end rectangular outside diameter; another straight taper; last two show step tapered outside diameters

Fig. 4—This shows application of part No. 467, used as rear retracting strut to extend and retract landing gear of a cargo and transport plane. It must withstand tremendous shock and thrust forces, yet be no heavier than necessary. Reduced end and first 5 inches of straight section where wheel fork is fitted to strut have a 0.375-inch thick wall. Remainder of straight section has only 0.1-inch wall

Fig. 5—Lehigh University found this Baldwin-Southwark tensile testing machine could be used to reduce the diameter of ends of small tubes. Die holders are designed so tube can only be reduced the desired distance. Resulting part meets close tolerances, needs a minimum of trim

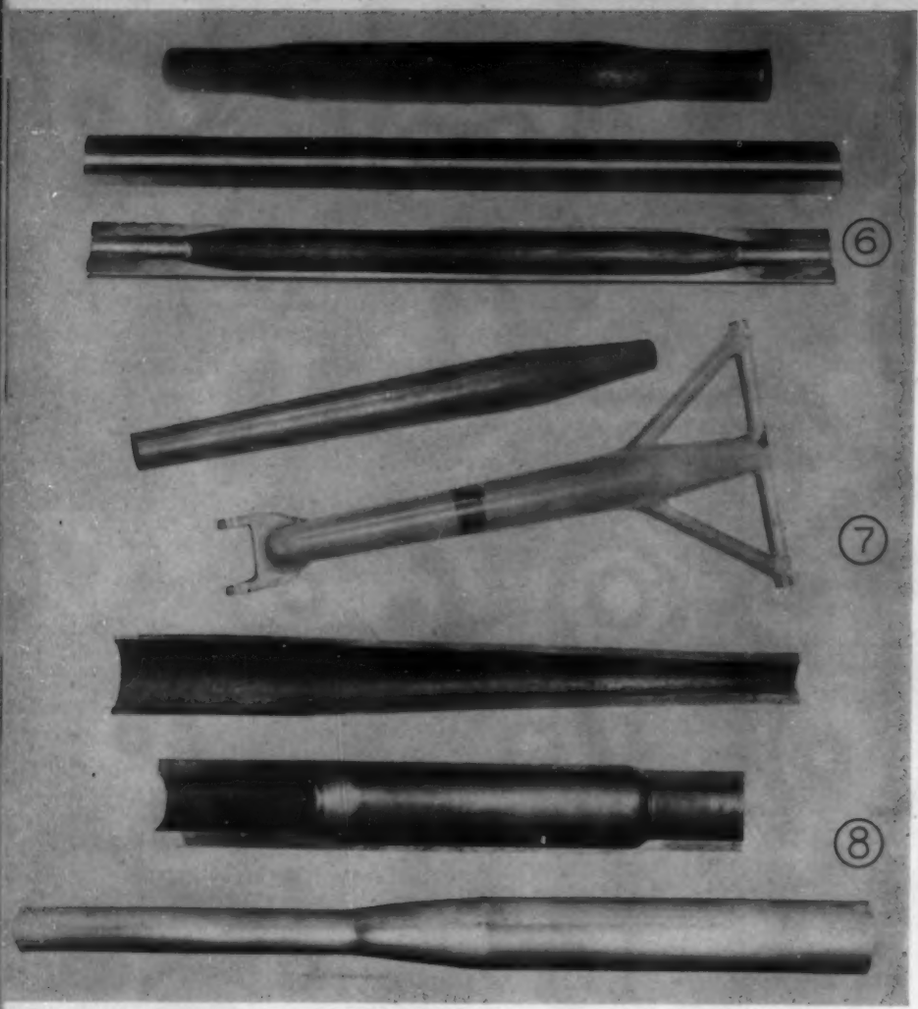


Fig. 6—To produce part No. 490, a tube is hot swaged to required inside and finished outside dimension at both ends as shown here at top. Next part is reamed inside of both ends and outside central portion is machined by chucking on the inside dimension. Bottom view is cross section through finished part. It is not possible to produce such a part without machining off excess metal on outside diameter due to extreme difference in wall thicknesses. A light walled tube cannot be hot upset and swaged back at the ends because mass of metal is too small to retain sufficient heat. Metal would fold

Fig. 7—Advantage of a tapered section in providing strength where needed is well illustrated by this straight tapered drag link. Outside diameter is 2¼ inches, tapered to 1⅜-inches at both ends, uniform wall thickness of 0.058-inch

Fig. 8—Top, part is hot swaged leg for diver bomber main landing gear before machining. Weight of 100 pounds is reduced to 35 pounds after finish machining. But even this represents much less material loss than if made from a forging. Aircraft axle, center, is made from straight tubing by machining inside and outside. Stock is removed primarily to reduce weight, retaining wall thickness according to strength needs at two ends. Bottom part for bomb release gear measures 3½-inches outside diameter with 0.065-inch wall tapered to 2-inches diameter with 0.083-inch wall. Originally made by welding two tubes with a long "fish mouth" joint, the 3½-inch tube being first swaged down to produce the taper to fit over the 2-inch tube. Welding costs alone were greater than entire cost of this finished taper, which also offers improved and safer design with less weight

just the opportunity this situation presented. His plan was to produce this part by pushing it into a die instead of the more conventional drawing method. This part is made from 3½-inch outside diameter tubing with 0.375-inch wall, and would require a hydraulic press of at least 200,000 pounds capacity with a 50-inch stroke.

In a few days' time, equipment ideally suited, after some conversion, to the proposed process was located. This equipment is in the Fritz Laboratory of Lehigh University in the form of a 900,000-pound compression tester shown in Fig. 2. After several weeks of experimentation, the process and tooling were worked out to handle these tube forming operations.

Now this work has been in production for more than seven months at Lehigh. Students and instructors handle the work on a 24-hour 7-day week schedule. Besides being a very satisfactory outside source for this work, benefits achieved from this connection with Lehigh include:

—22 per cent material saving, reflecting a conservation of 130,000 pounds of seamless alloy steel tubing.

—Annealing furnace relief of 1¼ million pounds of work.

—Production to more uniform weight, due to closer tolerance control. Now parts are more interchangeable than before.

—Production stepped up more than 500 per cent with additional increases probable.

—Less than 1 per cent loss through rejections.

—Release of tube producing equipment formerly devoted to this part, now used to increase our production of heavy bomber parts and other special parts.

Although the production of part No. 467 was the original objective in approaching Lehigh, it became apparent that this process was readily adaptable to many smaller parts. As a result it was expanded till now Lehigh is producing thousands of these smaller formed parts for many different aircraft. An illustration of this type of work is shown in Fig. 5 where a Baldwin-Southwark tensile testing machine is being used to handle a typical production job.

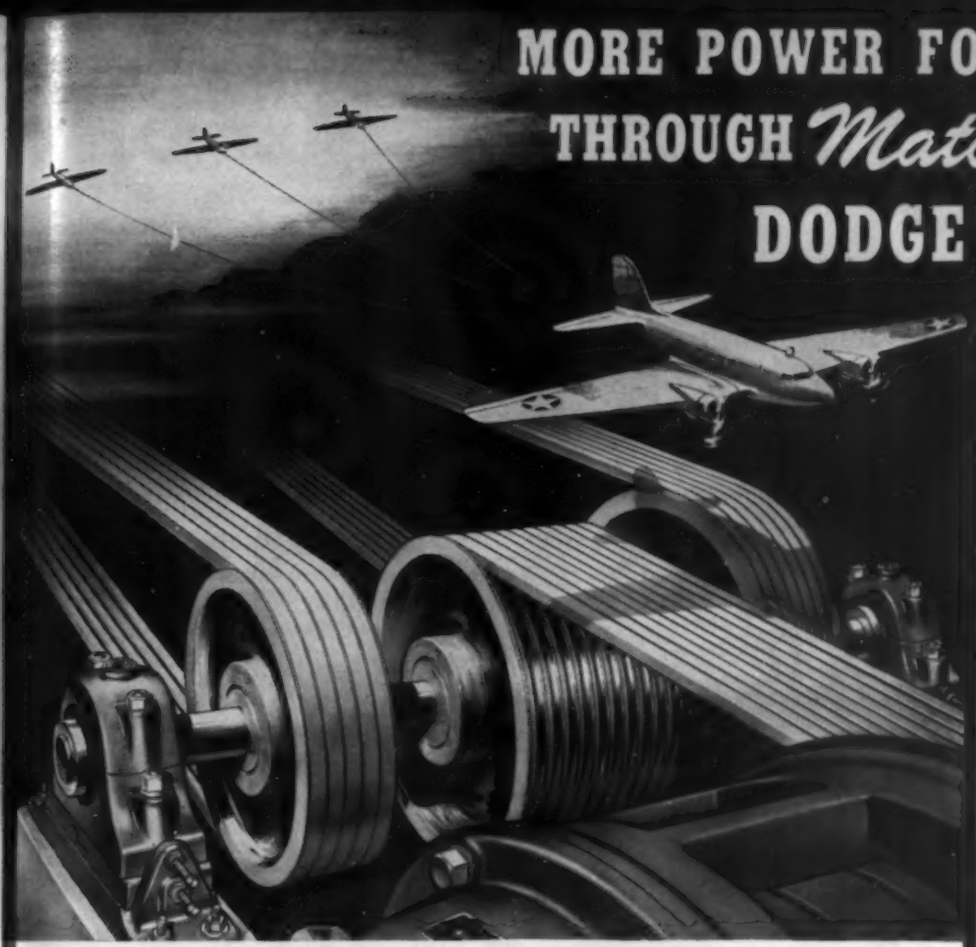
It would have been impossible to achieve these gratifying results had we not received the whole-hearted and intelligent co-operation of the men of Lehigh.

Other subcontractors help out, too. For instance, Tube Methods Inc., Bridgeport, Pa., is set up to do the machining of this same part No. 467. Fig. 1 shows one of these being chucked in a lathe prior to machining.

Straightening: The great majority of seamless steel tubing produced in other shapes than round cannot be straightened by high speed roll straighteners because of its shape. It must be straightened by other and slower methods. On heavy sections and sections of high physicals, band arbor presses are utilized. Tubing with thin walls or of low strength material must of necessity be straightened by hand.

Aircraft specifications require all tub-

MORE POWER FOR VICTORY THROUGH *Matched-Quality* DODGE D-V DRIVES



Matched to Get More *Battle Power* Out of Horsepower

In thousands of war production power transmission installations, Dodge Matched-Quality D-V Belts and Sheaves are delivering maximum developed horsepower to the point of production, to create more *battle power* and hasten Victory. Because sound engineering is combined with precision manufacturing, Dodge Matched-Quality D-V Drives have proven efficient, economical and able to stand the punishing 'round-the-clock performance demanded today.

You Get These *Advantages* In Dodge D-V Matched Drives

1 — Sheaves (in metal or "Victory" wood) have precision groove diameters, matched with D-V Belts, for uniform belt tension; each belt pulls its share. 2 — D-V Belts have concave sidewalls which, when flexed around sheave, form straight surface for full contact with flat sides of grooves; full transmission of power; longer belt life. 3 — Clean, noiseless drives, requiring no lubrication of any kind . . . no oil leakage or throwing of lubricant to damage work or rot belting. 4 — D-V Belts, cured under tension, require no adjustment, last longer; won't sag or slip. 5 — Matched sheaves and D-V Belts form complete modern power transmission unit backed by one responsibility: DODGE!

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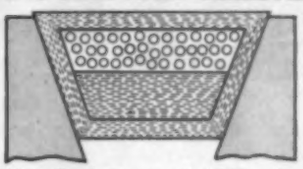
ON THE STRAIGHT RUN

Dodge D-V Belts have concave sidewalls.

ON THE D-V MATCHED SHEAVE



Sidewalls flatten to straight surface when flexing around sheave, thus providing full flat contact between belt sides and sheave-groove.

CONCAVE SIDEWALL PREVENTS THIS CONDITION

Sidewalls that are flat on the straight run, bulge in center as they flex around sheave, thus making only partial contact with groove, and causing undue wear.

EQUAL TENSION IN DODGE D-V BELTS

Correct engineering and precision manufacturing of both D-V Sheaves and D-V Belts ("Matched Quality") assure even tension on all belts of D-V Drives.

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If V-Belts and Sheaves are NOT matched, some belts will be too loose, others too tight; unequal tension means power loss and undue wear.

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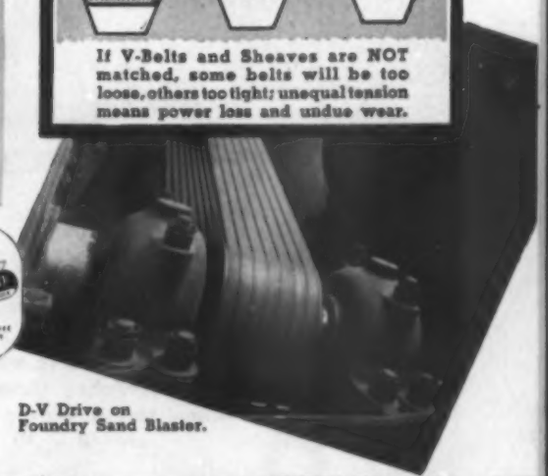


D-V Drive on Foundry Sand Blaster.

PUT *ALL* YOUR POWER IN THE JOB

ing have a straightness ratio of 1 in 600. Some special shapes are closer yet. Therefore, it can be well appreciated that the straightening operation can easily and quickly become a serious bottleneck.

Such production facilities as required for this phase were not easy to locate. First this work requires hydraulic presses of 75 to 100 tons capacity and of special design, adapted to this type of work. Secondly, and just as important, personnel trained to the special technique necessary is rare.

However, one very satisfactory subcontractor has been found and others are expected to be located soon. Through the use of the one subcontractor, it already has been possible to increase the production of heavy bomber parts by several hundred per cent.

Swaging: Our own swaging equipment is used to its fullest extent in regular production and any swaging as a finishing operation to produce a semifinished part was out of the question, except as it directly cut production of straight tubing. Swaging equipment of the type required is of such a special nature that delivery of additional equipment in sufficient time to meet requirements was out of the question.

After weeks of search and further weeks of engineering collaboration, we were successful in developing an extremely satisfactory source for this operation on our semifinished parts. This subcontractor has since produced for us more than 20,000 semifinished parts in as many weeks as it would have taken us months to do the same job on our available equipment. This production was all realized without our own output being affected in the slightest.

Tapering: For many years, we have produced large quantities of straight tapers and step-tapered tubular parts for aircraft and other manufacturers. The use of tubular parts with tapered diameters is extremely advantageous in aircraft design. Tapered tubes give a better weight-strength ratio for a given part. Too, they materially reduce the weight of fittings, due to their smaller diameters.

Many of these special tapers are produced on our own equipment. In some instances, this is necessary regardless of backlog and production difficulties. It is essential that these special parts receive the attention of expert seamless tubing men, notwithstanding the fact that specialized equipment is very necessary for successful production.

As a result of developing outside tapering sources, further lightening the load on our own equipment and personnel has been possible at the same time increasing production of special parts has been obtained.

Heat-Treating: Three well established sources of heat treatment, two of which are commercial heat treaters and one a peacetime manufacturer of household stoves and ranges, have been a great aid in increasing our output. With considerable work and expense, the vitreous enameling equipment of the stove manufacturer was changed over to enable them to heat treat our tubing satisfactorily.

These heat-treating sources have not only increased our production, but have enabled us to shorten our deliveries, as heat treatment is one of the final operations necessary. Often items are finished in the tube mill, but delivery is delayed awaiting final heat treatment. This is no longer true now that these supplementary heat-treating facilities are available.

Cutting: Every piece of seamless steel tubing produced must receive two cuts when finished, regardless of whether it is 20 feet or 2 inches in length. Many thousands of pieces are supplied in short lengths with tolerances of a few thousandths. Such an operation requires some kind of machine or lathe cut in most instances.

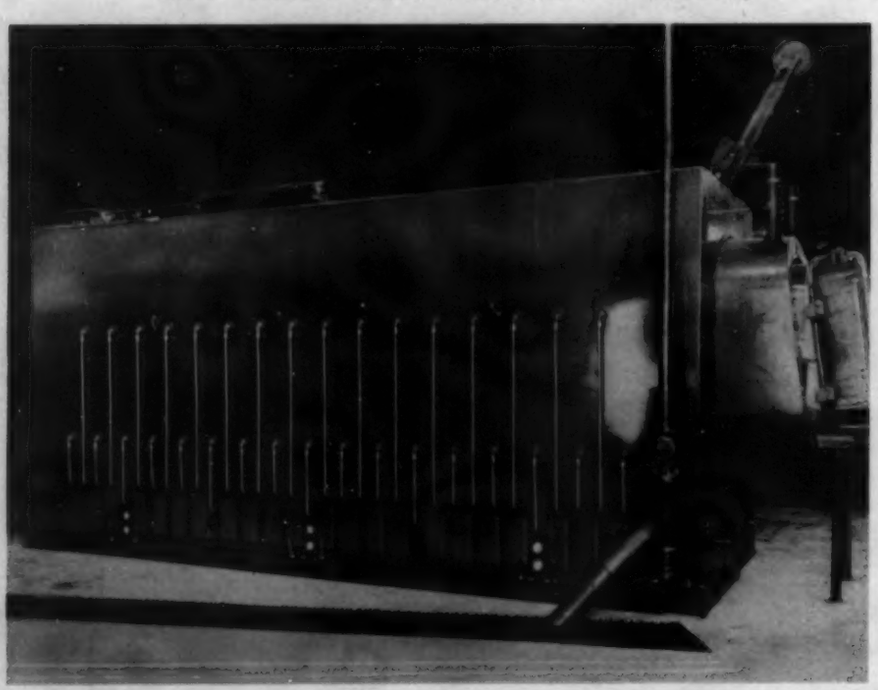
To alleviate any possible bottlenecks from this operation, high speed cutting sources were developed and are now producing thousands of cuts per day for us. This is a tremendous relief on our own equipment and directly reflects in increased production.

Sand Blasting: Some important aircraft tubular sections must be sand blasted to facilitate magnetic inspection and plating. When our own facilities became badly loaded, we found a local monumental marble yard which had suitable equipment.

Grinding: In many instances customers request special tolerances which can only be realized by centerless grinding. All available grinding equipment at Summerill was loaded to capacity long ago. We have now established sources who are very able and who perform a goodly percentage of our centerless grinding.

We early discovered that it was not possible to obtain equipment and facilities ideally suited to our peculiar requirements. Therefore it was necessary for us to make the best out of what was available in our area and put as much equipment as possible to its best use. In some instances, we believe we are getting more out of certain equipment than was ever intended by its designers.

HEAT TREATS 3000 POUNDS PER HOUR



OPERATING twenty-four hours per day in the eastern plant of one of the world's largest propeller manufacturers, this heat treating furnace is reported to be one of the largest chemically-neutral atmosphere furnaces yet built. Built by Lithium Corp., Newark, N. J., it has a capacity of about 3000 pounds per hour. It features a muffle designed to withstand working temperatures ranging from 900 to 2100 degrees Fahr.; sixteen-inch wall insulation and sixty-six specially-designed burners to insure even heat distribution. The furnace measures 8 x 10 x 30 feet

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METALLURGISTS
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NE STEEL
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• This 72-page reprint handbook on NE ALLOY STEELS has been compiled by the magazine STEEL from the outstanding material published since the National Emergency steels were developed early in 1942. It is divided conveniently into three sections and contains a complete cross-index for detailed reference on any particular standard or NE steel.

Section I reviews the history and development of NE steels, with papers by Charles M. Parker, Secretary, General Technical Committee, American Iron & Steel Institute and R. W. Roush, Chief Metallurgist, Timken-Detroit Axle Co., Detroit. Section II gives the Jominy End-Quench Hardenability test charts on both standard and NE steels, and Section III contains ten User Reports, detailing experience in the successful application of NE steels.

The handbook should serve as a valuable guide to all metalworking plants faced with the problem of substituting NE steels for standard alloy steels not now available.

• The editors of STEEL have developed an NE STEEL SELECTOR, 9" by 11", which by simply pulling out the unique slide-chart gives you at a glance the chemical analyses for the complete list of NE Steels, a listing of the more popular standard steels and the possible alternate NE steel which may be substituted. A cross-index is also given on the Selector with page reference numbers in the NE STEEL HANDBOOK for more detailed information on end-quench test charts and for successful applications of NE steels by various consumers.

Both the Handbook and the Selector are an attempt to bring up-to-date the information so far made available on the National Emergency steels and correlate it in such a way as to be a help in the selection of a suitable alternate.

The Handbook and Selector, together, sell for $1.00 and the coupon below may be used for placing your order now.

STEEL, Readers Service Dept.
Penton Building, Cleveland, Ohio

Please send ..... copies of STEEL's new NE STEEL HANDBOOK AND NE STEEL SELECTOR at $1.00 per set.

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Please include 3% State Sales Tax for orders originating in Ohio.

INDUSTRIAL EQUIPMENT

Reciprocating Sander

Lintern Corp., Nedco Division, 50 Lincoln avenue, Berea, O., announces a model R reciprocating sander for finishing jobs difficult to do by hand. It features a unique principle that eliminates

violent vibration and lost motion ordinarily expected from a speed of 300 oscillations per minute.

The unit is supplied completely ready to plug in the nearest outlet. Hand grips, balanced weight and smooth action enable the sander to apply even pressure on the work. Its motor can be removed for servicing without disturbing main drive assembly. Unit is light enough to be used by women workers throughout a work shift without excessive fatigue.

Electric Platform Truck

Rocky Mountain Steel Products Co., 1346 Wall street, Los Angeles, is offering a new Blue Streak electric platform truck for moving raw or finished materials within or around industrial plants. It features an 18-square foot platform of ½-ton capacity, four forward and reverse speeds from 1 to 6 miles per hour and small turning radius.

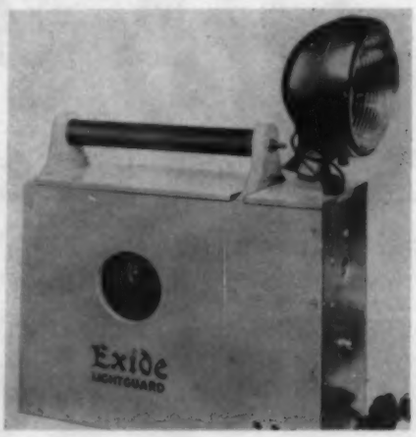
The truck was designed to meet war-

time necessity for women operators and was provided with a seat, a steering wheel and a foot throttle so that it could be operated like a conventional automobile.

According to the company, extremely low tare weight of the unit results in maximum efficiency in effective loads and permits its use on balconies, freight elevators and other lightly floored areas. Standard equipment includes combined foot and hand controls, Lockheed hydraulic brakes, a parking brake and an electric horn. Batteries may be recharged while the truck is idle through built-in plug at the front.

Emergency Lighting Unit

Electric Storage Battery Co., Nineteenth street and Allegheny avenue, Philadelphia, reports a new Lightguard emergency lighting unit for wartime service which requires no fixtures or wiring other than plug-in connections to the alternating-current supply. It is designed to meet the need in war plants, arsenals, ordnance plants, shipyards, factories, and other places where wartime activity increases the potential dangers resulting



from power-line failure, fires and sabotage.

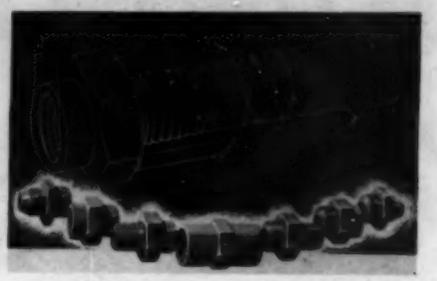
The unit throws a beam of light 50 feet wide a distance of 150 to 200 feet, covering an area of 7500 square feet. It is for use where workers are employed at night on machines, particularly in crowded spaces. Because it is a self-contained unit weighing only 47 pounds, it can easily be moved about.

The unit operates instantly and automatically. The only maintenance required is the occasional adding of water. Recharging is done automatically by trickle charge. State of charge is clearly indicated by pilot balls. Illumination is provided by a sealed-glass type, prefocused auxiliary driving lamp similar to those used on modern automobiles. The unit measures overall 16½ x 6¼ x 18 inches.

Check Valve

American Screw Products, Los Angeles, is offering a new type universal Asp check valve that allows twelve combinations to be made with one body and any two or three types of adapters.

Designed primarily for installation in airplane hydraulic lines, it is claimed by the manufacturer to be 16 per cent lighter and to have a two to four times increase in flow capacity with corre-



sponding reduction in back pressure.

A phenolic poppet seats at either end of the valve body. Adapters are available for flared tubing or external and internal pipe threads. According to the company, the valve is unaffected by vibration, variable pressures, or acceleration, and it provides positive protection in critical lines. They are manufactured to Army Corps, AN and Navy specifications.

Eye-Protection Glass

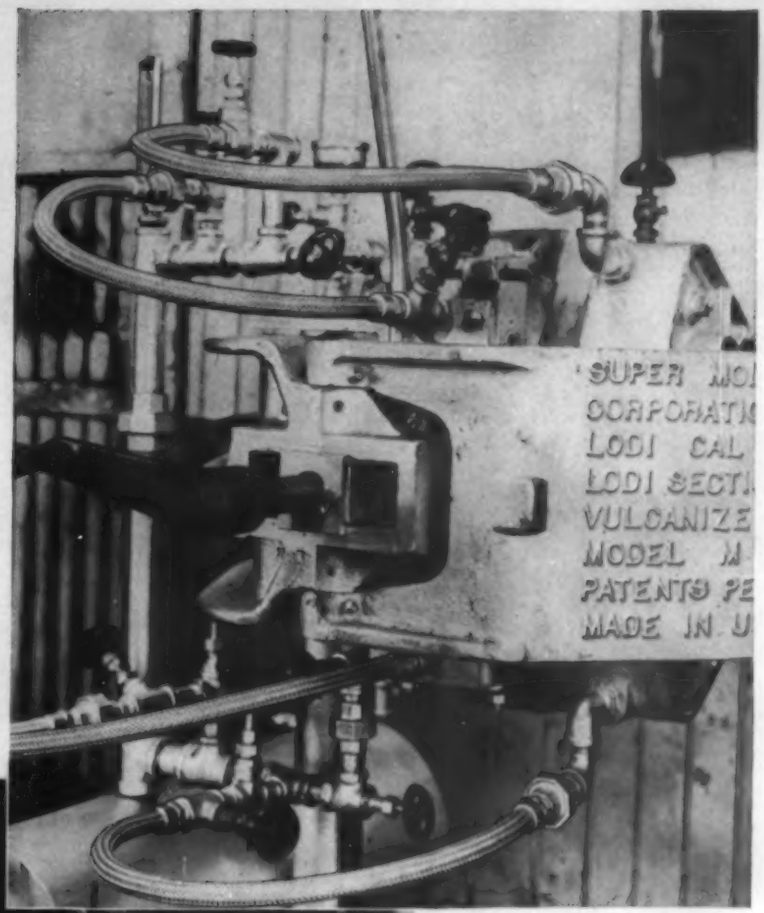
American Optical Co., Southbridge, Mass., reports development of a new eye-protection glass — Didymium-Noviweld—which permits eyes of gas welders to pierce blinding glare and see welding operations from beginning to end, a factor which may help speed up the welding of military planes, ships, tanks and other battle equipment.

Lenses of the new glass possess all the ray-absorptive properties of Noviweld glass, plus special characteristics of Didymium, a combination of elements with high absorption in that particular portion of the visible spectrum where

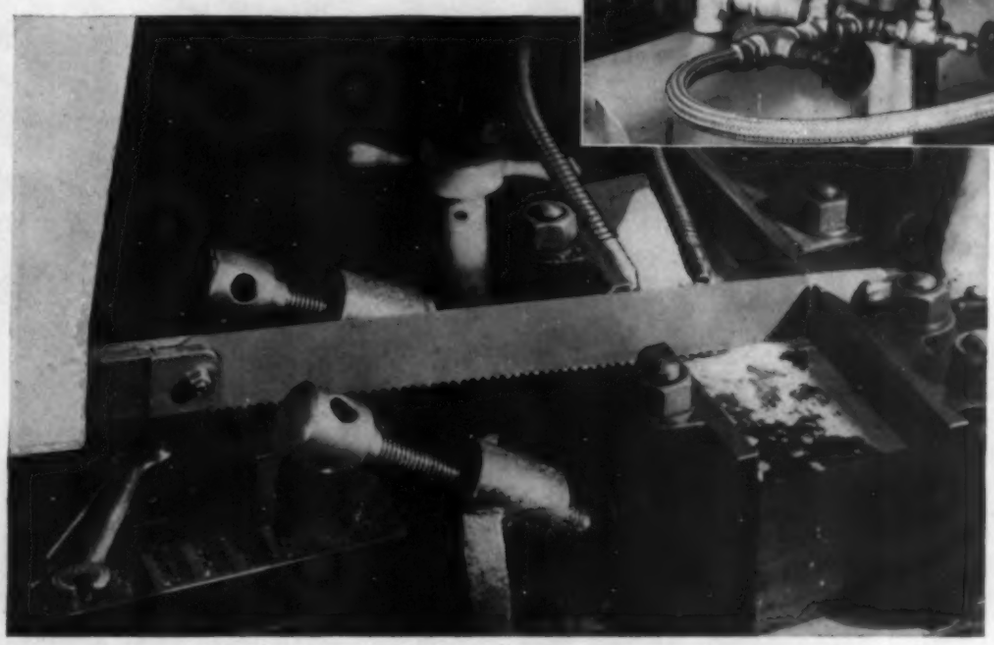
"flux-flare" normally obstructs clear vision.

In all types of flame-welding, it is said, the safety goggle lenses cut down the high intensity sodium rays of the fluxes. Flame workers thus can look right through the yellowish cloud of

STANDS OUT BECAUSE IT STANDS UP



"RETREADING WAR-NEEDED TIRES" ▶
American Seamless Flexible Metal Tubing is ideal for steam lines on the modern tire-retreading machine, as witness this vulcanizer made by Super Mold Corporation. Fully flexible so as to allow free movement of the vulcanizer head, American Seamless is, of course, all metal . . . cannot dry out or crack under the intense heat required for vulcanizing.



◀ **"SAWING WAR-NEEDED METALS."** A Simonds Saw and Steel Co. installation showing coolant lines of American Flexible Oil Feed and Coolant Tubing. Made of spring steel wire, this superior tubing readily bends to any position . . . stays put when bent . . . directs a continuous flow exactly where needed.

Whether you need a flexible connector for conveying air, water, oil, steam or fuel—for isolating vibration or for connecting misaligned or movable parts—the chances are we have a type of flexible metal hose or tubing that will do the job more capably.

Using virtually any workable metal, we can build flexible hose or tubing for applications ranging from a simple spout to a high pressure seamless hydraulic line that can be flexed millions of times without breaking. *American Seamless* gives you the flexibility of garden hose . . . the dependability of metal . . . *and the strength of rigid pipe.* 43190

AMERICAN METAL HOSE BRANCH
OF THE AMERICAN BRASS COMPANY
General Offices: Waterbury, Connecticut
Subsidiary of Anaconda Copper Mining Company
In Canada: Anaconda American Brass Ltd., *New Toronto, Ontario*

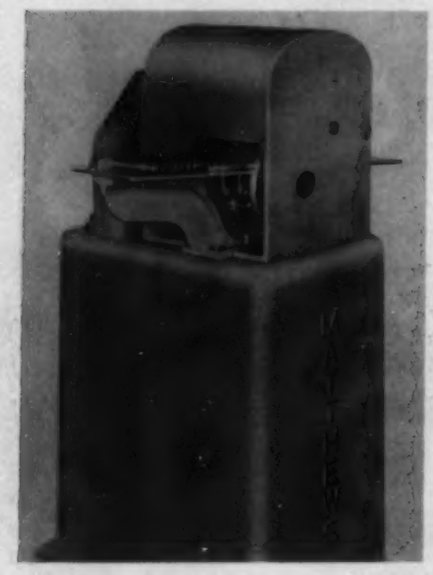
ANACONDA

American Metal Hose

"flux-flare," see the rod and the molten area more clearly, and thereby step up their efficiency in every phase of the welding operation, particularly the flame welding of aluminum and steel. The lenses also protect eyes by absorbing the harsh, tiring invisible ultra-violet and infra-red rays generated during welding.

Printing Machine

Jas. H. Matthews & Co., 3942 Forbes street, Pittsburgh, announces a newly developed marking machine for printing color bands, insignia and other important data on cylindrical bodies of grenades, signal flares, cartridge cases, etc. Essentially, the machine consists of an input gravity feed chute, printing unit,



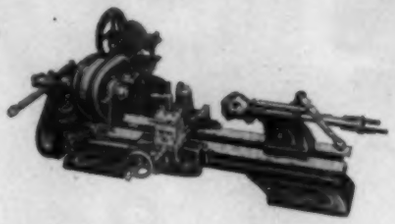
gravity takeaway chute, and drive.

Parts are placed into chute by hand and rolled by gravity to the printing unit. Latter consists of a printing plate cylinder, ink pan, roll and doctor which places ink on the face of the printing plates, cradle rolls which hold piece to be printed during printing operation. Machine is driven by a ¼-horsepower, geared head motor with a three speed cone pulley belt drive. The machine uses liquid inks, either dye or pigment colors. Production depends entirely on the operator's ability to keep the feed chute relatively full.

Screw Machine

Atlas Press Co., Department 7, Kalamazoo, Mich., reports the availability of production attachments which converts its F-series 10-inch lathe into an efficient hand-type screw machine for rapid production of small precision parts. The addition of independent or universal chucks adapts this equipment to turret lathe work, it is said.

This most recent lathe production setup as pictured includes: Lever-type collet chuck; carriage turret with 4-way



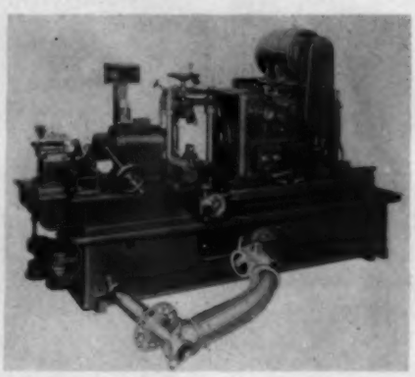
tool post and back-slide tool post; tailstock turret for six operations; multistop attachment for gaging length of cut; reversing switch; spindle nose cap.

Lathe is equipped with reversible power cross feed and longitudinal feed, complete V-belt drive, tapered roller spindle bearings. Its collet capacity is ½-inch; swing over bed 10¼ inches; sixteen spindle speeds between 28 and 2072 revolutions per minute are featured in the setup.

Boring, Facing Machine

Snyder Tool & Engineering Co., Detroit, recently introduced a machine for accurately boring and facing parts that have a tendency to vary in length slightly. A single-spindle hydraulic boring and facing unit, the machine is equipped with a unit having a heavy-duty worm wheel driven spindle which can be operated at any one of eight speeds.

Tooling consists of a breech lock spindle adaptor and various boring, facing and undercutting tools. Distances which various tools feed through the work piece are controlled by a revolving control dog



rail, which is quickly set up for each individual tool. Following each work cycle, the spindle returns to position allowing operator to exchange tools.

The workholding fixture of the machine is manually operated. Part is located and clamped against two ground diameters on a shaft exactly at right angles to the boss that is to be bored. Because parts vary slightly in length, it was necessary to provide on the fixture a means of indicating the stock variation and then compensating for it by moving the solid stops on the spindle unit.

The part length indicator, beneath the electric push buttons, detects the amount of variation which is compensated for by setting the second indicator, above the chip chute at the front of the fixture, at a reading corresponding to that of the part length indicator. Final clamping of the hub to be bored and faced is done through equalizing V jaws.

Tilting Fork Truck

Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia, announces a new model KM 30-2 bantam size telescopic-lift tilting fork truck which is capable of handling 2000-pound loads with speed and safety. Measuring only 98 inches from 30-inch fork tip to stern, it speedily navigates narrow aisles,

around sharp corners, and in close quarters carrying full capacity loads.

With a single fork height lift of 71½ inches and additional telescopic lift reaching to 129 inches, the truck moves, tiers, stacks and stores materials ceiling high. Unit features four speeds forward and reverse, all controls being in accessible positions. Operator works from the center of the truck chassis frame, in a protected position, with perfect visibility in all directions. The truck is said to be ideal for shipping, receiving, warehouse and general freight handling.

Socket Wrench

F & H Mfg. Co., 2207 West Jefferson street, Los Angeles, announces a new type Wedge-Lock socket wrench said to be ideal for close quarter use. It has no ratchet to limit movement, wear or break. Two hardened steel free-mov-

One of 9 Cooper-Bessemer Type G-MV-diesel-driven air compressors at the Chester, Pa., plant of Sun Shipbuilding and Dry Dock Company.

SUN ANSWERS THE $64 QUESTION..

Compressed air lines are lifelines at Sun's Chester shipyard. To maintain them is a "must" — if ships are to meet and beat schedules, in answer to America's desperate shipping needs.

How to provide an unfailing supply of compressed air for vital operations was an easy question for Sun. They installed compressors which they knew could and would deliver . . . Cooper-Bessemer Type G-MV's . . . diesel-driven. Powerful 4-cylinder diesels, operating compressor cylinders in pairs, run night and day, month in, month out . . . efficiently, dependably, economically. Air pressure is always instantaneous, adequate, uniform.

G-MV air compressors are available today, either gas engines or Diesel engine driven. If yours is a vital war industry and you need dependable compressed air, call on Cooper-Bessemer.

The Cooper-Bessemer Corporation

MOUNT VERNON, OHIO GROVE CITY, PENNA.

New York Washington Gloucester, Mass. St. Louis Houston Los Angeles Seattle New Orleans

ing shoes serve as an instantaneous acting clutch. At the point the handle comes to a stop on the back swing, the wrench is immovably locked for the tightening pull. The minimum return motion before engaging is: Clockwise,

1.2 degrees; counterclockwise, 1.2 degrees. Thus it may be said that the Wedge-Lock is "the million position wrench". It is being offered in four sizes: ¼, ⅜, ½ and ¾-inch.

Lifting Device

Never-Slip Safety Clamp Co., Mamaroneck, N. Y., announces a new lifting device for handling coils of strip. Readily adjustable for a wide range of coil sizes, it is particularly designed for handling coils in a horizontal position without first raising the coil.

According to the company, brass, copper, aluminum or steel may be handled with the lifter which is entirely nonmagnetic and can be used on any crane or hoist without the need of special equip-

ment. A feature of the unit is its low headroom requirement which increases storage capacity and also simplifies conveying of material from storage to presses.

Grinding Wheel

American Emery Wheel Works, Providence, R. I., announces a new precision grinding wheel of open cellular construction for toolrooms. Its open porous construction is said to give plenty of chip-clearance and space for air cooling to cut hardest alloyed steels without loading or "burning." On the job, the wheel cuts freely and requires a minimum of dressing. In wet grinding, its porosity enables it to carry extra coolant.

Steel Hardening Furnace

Sentry Co., Foxboro, Mass., announces a new edition of its No. 2 model Y electric, high speed steel-hardening furnace—one reported to contain many features deemed desirable after several years of user experience.

For the operator's convenience, the furnace now features an asbestos loading shelf at the front. It is of ample width and depth to permit easy arrangement of several furnace loads. New metal guards embodied prevent possi-

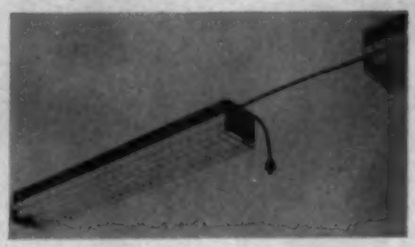
bility of accidental contact with live power supply.

Throughout the furnace, many points were redesigned for added strength and durability. Diamond blocks used in connection with this and other model Y furnaces were recently materially reduced in price.

Mechanic's Light

Lumidor Mfg. Co., 3120 East Pico boulevard, Los Angeles, is introducing a new double-circuit mechanic's light with receptacles for plugging in small power tools and additional fixtures. As many as four lights can be connected in line to a maximum of 60 feet from a single outlet, according to the manufacturer.

The light originally was designed to illuminate the fuselage interiors of large aircraft during construction, but the unit is being widely adapted to other industrial uses. A 24-inch unit containing two 20-watt lamps and 48-inch unit containing two 40-watt lamps are offered. Both are available for either 50 or 60-cycle



current and are of high power factor type to eliminate flicker. Brackets for hanging and a hinged wire lamp guard represent standard equipment.

Steel Caster

Rapids-Standard Co. Inc., 535 Bond avenue, northwest, Grand Rapids, Mich., announces a new Nicro steel caster for use on portable tanks, pumps, dollies and floor trucks. Its main features are the adaptation of Nicro steel castings to new principles of caster design, embodying two complete large diameter ball raceways and the inclusion of a long lead or "rake"—the basis of easy swiveling due to the strength of the caster.

Casters are being made with either metal or ABK resinoid floor-protective

wheels. Rolling bearings are standard in most models; oilite or porous iron bearings are also available for metal wheels. Wheel sizes range from 3 to 6 inches in diameter.

According to the company, test models under laboratory and actual operating conditions indicate that most satisfactory performance can be anticipated under loads ranging from 400 to 800 pounds per caster in average industrial plants over wood, concrete or end-wood-block floors.

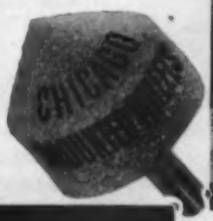
SAY! YOU, UP THERE on the PRODUCTION FRONTS

No more holding up the steady flow of vital war needs because you're waiting for grinding wheels.

WE'RE RIGHT BEHIND YOU

Can make prompt deliveries on all Mounted Points and Grinding Wheels 3" in diameter and under. We've stopped making the larger sizes for the duration, so we can fill orders quickly for these important smaller sizes.

TRY ONE FREE—Tell us the kind of job, type grinder you use and size wheel you'd like for your test, and we'll send one free postpaid.



CHICAGO WHEEL & MFG. CO.

America's Headquarters for Mounted Wheels

1101 W. Monroe St. Dept. ST Chicago, Ill.

IT'S OUR WAR-TIME JOB

With the approval and endorsement of W P B, all our facilities are concentrated on turning out large quantities of wheels 3" in diameter and under. We're at it 24 hours a day, and keeping up with orders. Our central location is an advantage and means no time is lost between our production line and yours.

NEW CATALOG—shows mounted wheels in actual colors and sizes, portable electric tools and time-saving accessories for grinding, burring and polishing.

MAIL THIS COUPON TODAY

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☐ Send Catalog.

☐ Free Wheel. Size. .....

Name .....

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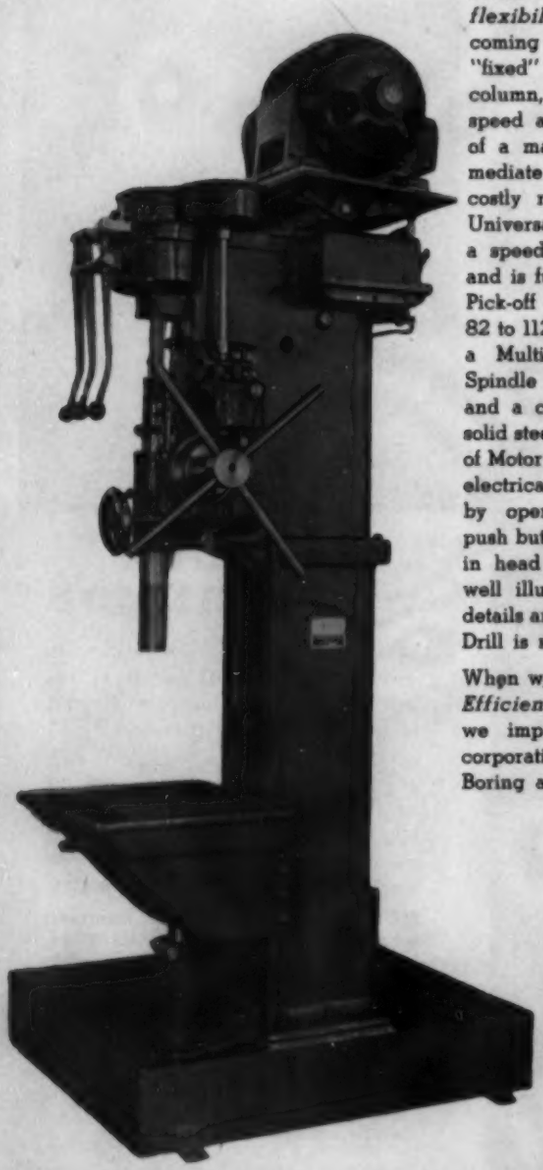
POST-WAR BUILD-UP

and the

Model 150 **UNIVERSAL QUICK CHANGE TYPE HEAVY DUTY DRILL**



● *The more versatile a machine tool at birth, the less likely its being tagged "war-baby" at the close of hostilities.*

BAKER Drills set a splendid example of *flexibility* in machine design—thus overcoming the danger of being "typed" or "fixed" in limitations. The illustrated box column, heavy duty tool with its wide speed and feed ranges is representative of a machine that may be set into immediate specialized production without costly re-design. This Model No. 150 Universal Quick Change Type possesses a speed range from 48 to 1120 R.P.M., and is furnished standard with one set of Pick-off gears giving total of 24 Speeds, 82 to 1120 R.P.M. Other features embody a Multi-Vee Belt Drive, Multi-Splined Spindle Drive, Two-Piece Frame Design and a capacity of a 1-1/2" dia. drill in solid steel. For added Flexibility reversing of Motor for tapping furnished as standard electrical equipment. Spindle reversed by operator manually thru means of push button station, conveniently mounted in head of machine. A newly printed, well illustrated bulletin listing complete details and specifications on this particular Drill is now available on request.

When we say—"*Machines: Sturdy and Efficient—As Fine As Can Be Built*"—we impart a principle of design incorporating the full line of BAKER Drilling, Boring and Tapping Machines.

ARMY E NAVY

FOR EXCELLENCE

On March 20th the loyalty, skill and diligence of the employes at Baker Brothers were recognized with an Army-Navy Award for excellence in production.

BAKER BROTHERS *Incorporated*

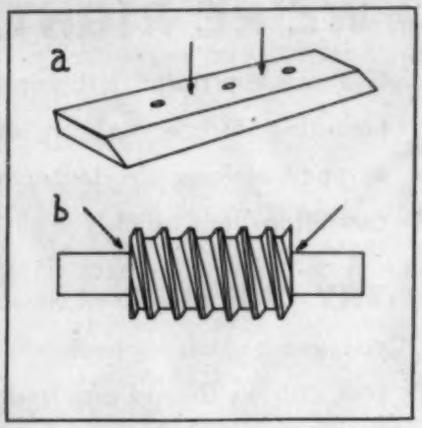
TOLEDO, OHIO, U. S. A.

Straightening

(*Concluded from Page* 112)

ing the steel slightly before spotting, either when the part is chilled, or the section dangerous. In this case the torch should be adjusted to a soft flame which is played over the entire surface until temperature reaches about 250 to 300 degrees Fahr.

Shear blades are well suited to spotting. As shown in the illustration, the torch is applied to the side where hardness is unimportant. Side broaches can often be brought straight if the high side of the warp is opposite the teeth. Cer-



Shear blade is spotted at arrow points at a *to straighten it. To correct distortion of shaft of worm at* b, *it is spotted at points indicated*

tain types of mandrels and arbors used at about 48 to 50 rockwell C can be spotted for straightening also. Rings can be spotted flat by hitting them on the high side.

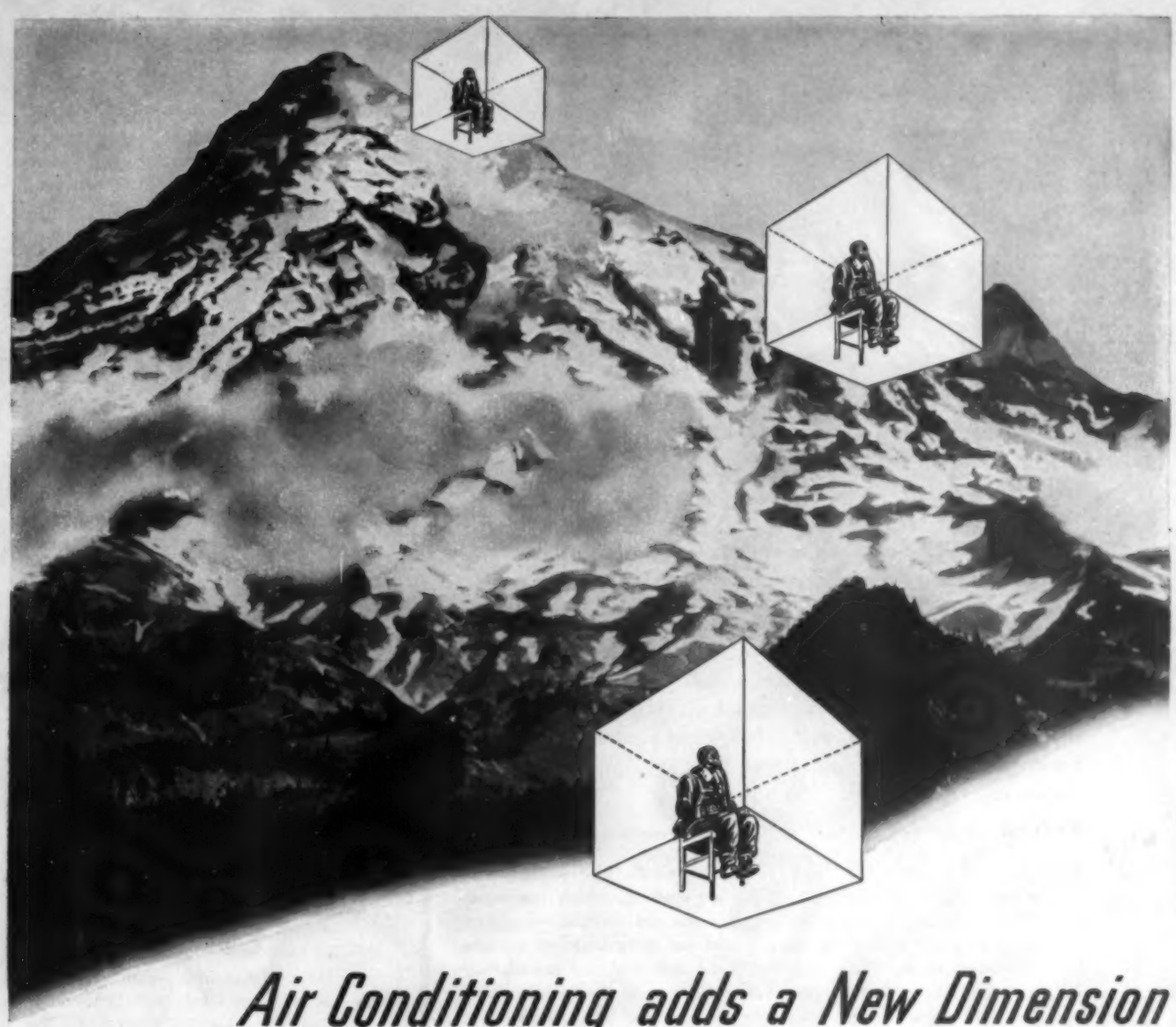
On long work having a considerable sweep, two or three spots at about 1-foot intervals may be necessary to straighten the part.

Much practice is essential to achieve success in spotting. Let one man in the shop be assigned to that work, then he will develop more quickly the deft touch that marks the difference between success and failure. He will also acquire the very necessary knowledge as to the movement to be expected from various steels and sections.

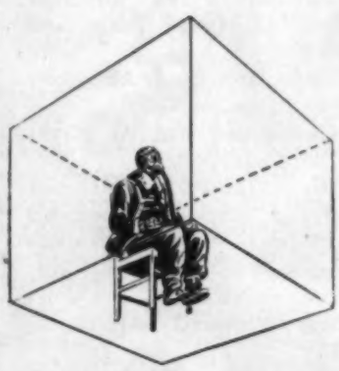
Paint for Plant Floors

New type traffic marking paint, Porcelite, developed recently by Thomson-Porcelite Paint Co., 829 North Third street, Philadelphia, is reported to give street and plant floor markings unusual permanence and visibility.

Formulated on synthetic principles, it is already in use in industrial plants, municipalities, airfields, parking lots, etc., being applicable on wood, stone, asphalt, wood-blocks, composition and cement.



Air Conditioning adds a New Dimension



Originally, people thought of air conditioning only in terms of *temperature.* It cooled the air on a warm day. Temperature was air conditioning's *first* dimension.

Then came a second dimension . . . *movement.* Air had to be moved . . . under control.

Then a third dimension . . . *humidity* . . . control of the amount of moisture in the air.

Then, air conditioning took on a fourth dimension . . . *dust exclusion.*

And now, air conditioning is cooperating in an important new field . . . controlled air *pressure.* This is needed for the testing of men and equipment under the conditions of stratosphere flying.

Today, air conditioning faithfully reproduces *exact climates* . . . from the parched heat of the Sahara to the frigid cold of Northern Russia. The equipment that does this must be more flexible, more compact than ever before . . . with precise control of temperature and humidity.

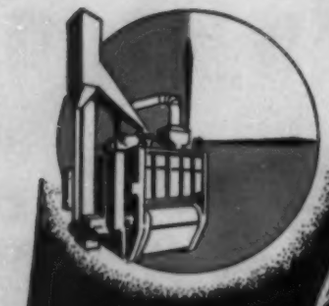
This equipment . . . from General Electric . . . speeds up America's war effort. When peace comes, this improved air conditioning will become available for many new uses.

Then, as now, look to General Electric as the outstanding supplier of up-to-date air conditioning and industrial refrigeration equipment of all kinds.

Air Conditioning and Commercial Refrigeration Department, Division 434, General Electric Company, Bloomfield, New Jersey.

Air Conditioning by

GENERAL ELECTRIC



Airless
WHEELABRATOR
Cuts Forging Cleaning Job
From 5 Hours to 15 Minutes

★★★ WHEN the history of World War II is written, much will be said of the speed of American production . . . and the decisive part it played in overwhelming a foe that had been arming for at least a decade.

Thousands of advanced engineering ideas are at work right now to make this epic drama possible. Among these is the Wheelabrator airless method of abrasive blasting —the metal cleaning process that "works miracles with minutes." Take this example of cleaning forgings, for instance:

Federal Drop Forge Co. says:

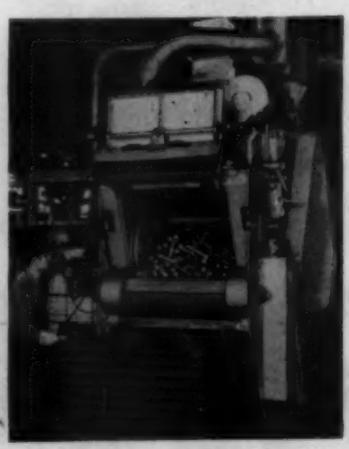
"The time factor has been greatly reduced. For instance, on a certain type of forging that we are making, which represents better than 50% of our work, under our old method we placed these forgings in the tumbling barrel for three hours to remove the excess scale. Then they had to be unloaded and carted over to the pickling house, where they were put in the pickling tank for another two hours. With the handling and all it made about five hours' operation, and we were not always successful in removing the scale. Now we perform this same operation in fifteen minutes and we get a beautiful, clean, polished job."

This is not just an isolated example, by any means. It is typical of what more than 2000 users are doing by Wheelabrating. And your cleaning problem can be handled just as speedily . . . we would be glad to have a chance to show you how.

AMERICAN
FOUNDRY EQUIPMENT CO.
Blast Cleaning and Dust Control Engineers

569 S. BYRKIT ST., MISHAWAKA, IND.

World's Largest Builders of
Airless Blast Equipment



ASTM Approves Seven Standards on Forgings

Seven new emergency specifications covering heavy forgings, primarily for use in turbine and generator parts, were recently approved by the American Society for Testing Materials, 260 South Broad street, Philadelphia, on the recommendation of its committee A-1 on steel.

According to the society, many members participated in the work of a committee on heavy forgings headed by C. J. Boyle, General Electric Co., which functions under the auspices of the National Emergency Steel Specifications committee.

The primary objective of this group was to concentrate production on a limited number of steels and to agree on standardized test methods and inspection, so that the rotors, gears and related turbine and generator parts could be expedited. It was essential that new industrial specifications be drafted and when these were agreed on in the technical committee, the ASTM was asked to consider the recommendations and issue them as emergency specifications.

A list of these specifications and the ASTM designation follows:

ES—21 Carbon-Steel and Alloy Steel Magnetic Retaining Rings for Turbine Generators.

ES—22 Alloy-Steel Non-Magnetic Coil Retaining Rings for Turbine Generators.

ES—23 Carbon-Steel Ring Forgings for Main Reduction Gears.

ES—24 Carbon-Steel and Alloy-Steel Pinion Forgings for Main Reduction Gears.

ES—25 Carbon-Steel and Alloy-Steel Turbine Generator Rotors and Shafts.

ES—26 Carbon-Steel and Alloy-Steel Turbine Rotors and Shafts.

ES—27 Carbon-Steel and Alloy-Steel Turbine Bucket Wheels.

In this same work the committee on heavy forgings developed emergency provisions in two ASTM specifications covering carbon-steel forgings for general industrial use (A 235-42) and alloy-steel forgings for general industrial use (A 237-42).

In the carbon general forging specification a new grade is being added to cover forgings over 20 inches in solid diameter or thickness with minimum tensile strength of 70,000 pounds per square inch and elongation in 2 inches of 20 per cent minimum. In the alloy specification a new requirement for class B forgings in big sizes will require a tensile strength of 80,000 pounds per square inch and a minimum elongation of 18 per cent in 2 inches.

EVER TAKE A MACHINE GUN APART?

A SOLDIER has to be able to do it blind-folded. And because he knows how, parts, accurate to the thousandths of an inch and produced in mass-production quantities, come apart and go together again in a matter of minutes.

Even the layman can understand how vital is precision in every item of fighting equipment like this. Take the bullet belt links for example. They've got to be uniformly perfect or the gun will jam in combat.

That unfailing uniformity starts with the strip steel from which those bullet links are made.

Every pound of American Quality Cold Rolled Strip we furnish in vast quantities for these high precision parts has to be—and *is*—"right on the nose" in chemical analysis, structure, dimensions and straightness. Otherwise, subsequent operations would fail to produce perfect links.

And because speed of manufacture is important, we further insure perfect workability in this material by bright annealing in furnaces of improved design. It enables the fabricator to set his dies and machinery for top-speed manufacture with full confidence of getting the precise results desired.

If you are fabricating cold rolled strip steel for war products, our metallurgical engineers will gladly help you use it to the best advantage.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

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American Quality
COLD ROLLED STRIP STEEL

COLD FINISHED STEEL BARS
MANUFACTURERS' WIRE · STAINLESS
STEEL SPRING WIRE · WELDING WIRE
WIRE SPRINGS

UNITED STATES STEEL

How a BAKER CRANE TRUCK solved a tough problem for Bailey Meter Co.

PROBLEM: To obtain greatly increased production without external plant expansion.
SOLUTION: Utilization of overhead space by constructing mezzanine floors, and substituting Baker Truck for traveling craneways removed. Truck also saves time and space at other points throughout plant.

Bailey products range from small instruments weighing less than 10 lbs. to complete control panels weighing more than a ton. In their manufacture, a wide variety of castings, bar stock and other materials require handling—from incoming carriers, in plant and warehouse, and to shipping. Besides substituting for removed overhead cranes, truck is used to relieve congestion on others, to handle material beyond their limits, to assist in the erection of control panels, to tier material for conserving space in storage, and for a wide variety of operations which were not anticipated when truck was purchased. Thus the company was enabled to attain increased production without increasing plant size.

In erection of control panels, Baker releases overhead cranes for other work.

Small parts in standard boxes are tiered by Baker Truck to conserve space.

A Baker Material Handling Engineer may solve similar problems for you. Check with him now for current or post-war needs, or write us direct.

BAKER INDUSTRIAL TRUCK DIVISION
of the Baker-Raulang Company
2167 West 25th Street • Cleveland, Ohio
In Canada: Railway and Power Engineering Corporation, Ltd.

Transferring bar stock from incoming cars to storage with Baker Crane Truck.

Baker Crane Truck spotting a large valve in position for crating.

Handling panels boxed for shipment—an awkward job made easy by Baker Truck.

1000-1A-43

Baker INDUSTRIAL TRUCKS

Resistance Welders

(*Concluded from Page* 110)

Typical of the direct ordnance applications of special high production resistance welding setups is that shown in Fig. 2. Here housings for the Army's giant parachute flares have their fins "stitched" on by rows of spot welds. The machine employed is a pedestal type resistance welder equipped with two guns, an upper and a lower, instead of the usual single gun. The center electrode is fixed and serves as a mandrel for guiding the housing. The locating fixture which keeps the fins in correct alignment during welding was removed in taking the photo in order to show the guns.

Both Guns Weld Simultaneously

To make the welded joint, the operator merely pushes the housing from one weld to another, the machine automatically repeating the welding cycle as long as the foot switch is depressed. Thus both guns weld simultaneously, being controlled from the same single timer. The machine, however, is equipped with two interlocking pressure switches to make sure that one gun does not weld without the other firing also.

As can be seen from the illustration, each gun is fixed in position with the electrode tip normally about ½-inch from the work. When the welding cycle is initiated, air under pressure is fed to the electrode cylinder to advance the electrode tip to the work and to exert the desired pressure while the weld is made. About 18 welds are required for each pair of fins welded simultaneously or a total of 36 welds for each complete housing with its four fins. The end ring is also spot welded to the main housing, using the same machine and the same setup.

Keystone Steps up Powder Metallurgy Operations

To step up production, Keystone Carbon Co., St. Marys, Pa., recently enlarged its operations in powder metallurgy to include production of small parts of special design and shape which eliminates machining operations, and conserves man-hours and mataerials.

Parts formerly produced by conventional methods necessitating such operations as reaming, turning, double milling, multiple drilling, etc., now are being produced by powder metallurgy in which pure metal powders are molded to exact size and shapes in one operation.

Parts currently being produced are cams, eccentric parts, levers, rotors, slide blocks, and other metal parts.

MORE *Producing Power* FOR SKILLED MANPOWER

Skilled manpower is one of the most critical of all our strategic resources. To give our fighters the added striking power of more and better weapons, our skilled workers need the producing power of more efficient tools.

Machine tools that are inefficient because they are hard to operate, inaccurate, or incapable of delivering the required speeds are wasteful of critical manpower. Wasted manpower is lost production—and victory jeopardized!

Give your skilled manpower more producing power with South Bend Lathes. Designed and built to deliver maximum production with minimum effort, they are highly efficient on a wide variety of precision machine work. Their ease of operation reduces fatigue and seemingly shortens the workday by hours. This is accomplished through conveniently placed, smoothly operating controls—clear-cut, easy reading graduations—fully enclosed design with no exposed pulleys, belts, or gears—and dependable precision that permits top speed production, even when tolerances must be held to extremely close limits.

SOUTH BEND LATHE CATALOG

The entire line of South Bend Lathes is described in Catalog 100C. Write for your copy of this new 48 page catalog.

Army—Navy Production Award with Star presented to the South Bend Lathe Works for outstanding war production.

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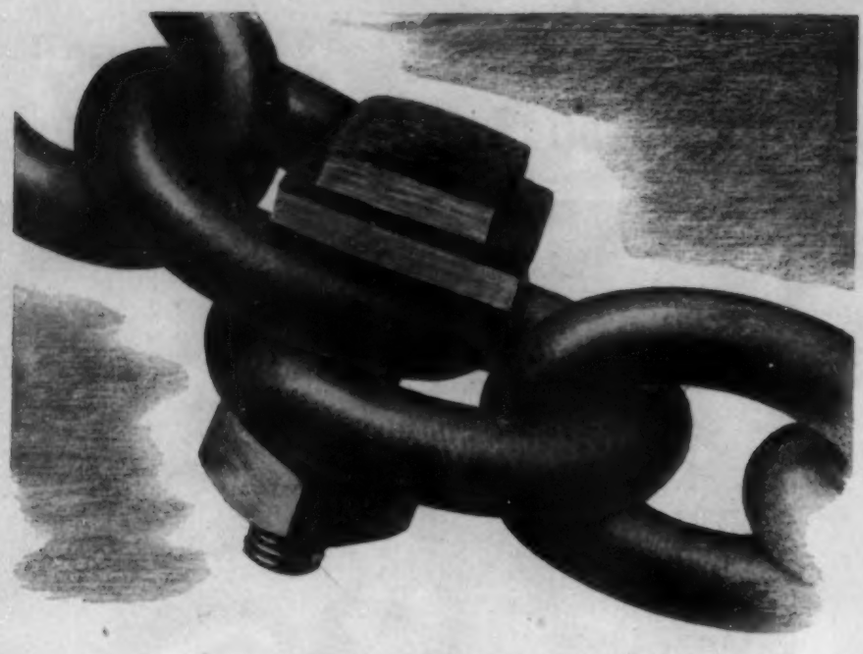

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AMERICAN CHAIN & CABLE COMPANY, Inc.

BRIDGEPORT • CONNECTICUT

In Business for Your Safety

Carbon—A Refractory

(*Continued from Page* 125)

phosphorus and phosphoric acid production.

However, about two years ago the first carbon tower was built for use in connection with sulphuric acid concentration. The fact that the carbon tubes in the precipitator had outlasted two chemical brick towers, and were still in good shape encouraged the plant operator to take a chance on a structure built entirely of carbon; floor, side walls, tube supports, roof beams, roof slabs, vapor outlet, and plenum chamber. Now after more than two years of continuous use there is no evidence of any chemical attack, and it is expected that the towers as well as the tubes will last indefinitely. That is a great relief to the maintenance department since a ceramic tower from the day it starts to operate, deteriorates and is a constant source of expense and worry. An added and originally an unexpected advantage of the carbon construction is the speed with which it can be erected, particularly important when a carbon tower replaces a ceramic one in these days of rushed production. It takes 5 to 7 weeks to put up a ceramic tower and install the tubes, while with carbon construction the job can be done in 8 to 10 days.

Use of Carbon Jumps in 5 Years

The tower shown in Fig. 17 will contain 81 tubes 13 inches O.D., 10 inches I.D., and 12 feet long. The overall dimensions are 14 x 14 x 27 feet high. The carbon vent pipe is 38 inches outside diameter by 33 inches inside diameter by 15 feet high. The wall blocks are 11½ inches thick by 28½ inches deep and up to 15 feet long. The tube support beams are 4 inches wide, 28½ inches deep and 14 feet long. The total amount of carbon in the structure and outlet pipe of an 81 tube tower is 250,000 pounds and that figure runs up to 350,000 pounds for a larger 117 tube tower.

The impervious forms of carbon and graphite sold under the trade mark Karbate†, have filled a long felt want of every chemical engineer because of their resistance to practically all attack, because of the ease with which they can be fabricated and particularly in the case of impervious graphite because of its high overall thermal conductivity which is considerably higher than for most of the generally used metals.

As a result of the development of these new materials carbon and graphite are being used today in hundreds of

†Trade name of National Carbon Co. Inc.

places where they could not have been considered five years ago. Thousands of feet of Karbate tubes have been used in various types of heat exchangers in processes that could not function economically but for them. The heat exchanger bundle (Fig. 18) is a typical example of a tube bundle made up of impervious graphite tubes 1¼ inches outside diameter by ⅞-inch inside diameter by 9 feet long, cemented into tube sheets of the same material. Whole exchangers have been made of Karbate material, shells, bundles, domes, outlets, inlets, and baffles, and have given complete satisfaction.

A satisfactory centrifugal pump (Fig. 19) is available in which every part coming in contact with the corrosive chemical is Karbate material and such pumps have been in service long enough to indicate complete satisfaction.

Importance of Carbon Growing

Miscellaneous applications of carbon, graphite, and the Karbate materials in the chemical field are a multitude; injectors, ejectors, float valves, Y-valves, globe valves, condensors, absorbers, towers, Raschig rings, simple and complex piping, in fact about everything the chemical industry needs is now made from carbon in some one of its forms and the industry has found a new tool.

The use of carbon for refractory purposes is small when compared to that of ceramics, whether the comparison be on a tonnage or a value basis, but it is important to industry, and daily growing more important. The slogan of one of the producers of carbon is, "Whatever your problem, think of carbon and graphite", and many of the foremost chemical and metallurgical concerns do just that.

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This AGILE electrode should be used for tipping chisels or beating tools. The weld metal possesses extreme toughness, excellent shock resistance and insures a long life cutting edge.
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CLEANING ALUMINUM ALLOY CYLINDER HEADS

① ② ③

1. AFTER SHAKEOUT
2. AFTER HEAT-TREAT
3. PREPARATORY TO METALLIZING

● TRADE journals have been featuring write-ups on the deep finned aluminum alloy cylinder heads for airplanes. Directives have ordered double the original tremendous production of bombers, pursuit, transport and other airplanes for immediate battle requirements. The needed number of cylinder heads jumped to astronomical figures.

Pangborn broke the impending bottleneck to this almost impossible production schedule by designing—and delivering—eight ROTOBLAST Airless Tables and twelve special semi-automatic Air Blast Machines for handling this great volume of cleaning. More are now being built.

The ROTOBLAST Tables are used for the first two cleaning operations. As they come from the shakeout the inside and outside surfaces of the cylinders are table cleaned to remove all sand. The units are again ROTOBLASTED to remove scale after heat-treating.

The final blast cleaning is done in special Pangborn Air Blast Machines. This treatment removes all grinding marks—and prepares a perfect surface for exterior metallizing.

This is a typical example of Pangborn development in Blast Cleaning. Prompt engineering and delivery action like this is helping to create new War Production records. We shall be glad to help you with your problems, too.

PANGBORN CORPORATION
World's Largest Manufacturer of Blast Cleaning and Dust Control Equipment
HAGERSTOWN : : : : MARYLAND

PANGBORN

Brass, Bronze Castings

(*Continued from Page* 106)

our source of supply of material to make the various grades of brass and bronze castings.

The designer, in the past, has given little or no thought to conservation but has specified the best material for the purpose intended. Composition G, or gun metal, has many important and traditional uses. In peace times when the supply of raw materials was unrestricted there could be little criticism of a designer who specified that excellent metal for many and varied uses. However, today the 0.2 or 0.3 per cent lead maximum in specifications for that bronze places it in a class requiring primary copper and tin for its manufacture. Now the designer must revise his thinking and specify the least restrictive material that will do the work at hand.

As indicated on the chart, in many instances composition *M*, or even 85-5-5-5 will give adequate service performances for many items where composition *G* has been specified. The armed services are recognizing this and have made many specification changes of this nature which conserve primary metal. The Navy, last spring issued a directive permitting the use of composition *M* in place of composition *G* in pressure castings. The Maritime Commission has changed propeller shaft sleeve from *G* to *M*, an alloy on which the Navy had standardized for the purpose.

More recently the Navy has pointed out the possibilities of the use of 85-5-5-5 for composition *M*, composition *G* or silicon bronze for sea water valves and fittings. It might also be noted that where structural strength is the primary consideration leaded manganese bronze is an excellent design choice, in place of composition *G*, silicon bronze or aluminum bronze.

There are times when a partial or full substitution of ferrous metal may be made for some of the nonferrous alloys—even in some uses directly or indirectly connected with our war effort. For instance, such is the current use of malleable iron tail-pieces for fire hose couplings that formerly were made of the underwriters mixture. Swivels, and couplings used aboard ship, are retained in a nonferrous metal. The alloy used, is a common leaded yellow brass that can be made entirely from secondary material and scrap.

Other possible design changes are shown on the chart and those which are currently most desirable are indicated by the use of heavier connecting lines. Results to date have been encouraging. Much progress has been made. The actual saving in primary copper by specification changes already is measured.

Much more still remains to be done. It is work in which all who are connected with the war effort can co-operate.

Ingot makers, foundrymen and others who have direct knowledge of items where changes can be made to conserve critical materials should bring them to the attention of those responsible for the specifications involved. Specific recommendations should be made. In this the Conservation Division of the War Production Board will gladly be of assistance. But it is primarily a challenge to the design engineer to see that by a closer examination of end use he secures the best possible utilization of our material resources to win the war.

Lintern Unit Air Conditions Crane Cabs

A new smoke and dust eliminator for crane cabs, called an Aire-Rectifier for protecting crane operators from harmful dusts, vapors and gases causing occupational diseases is announced by Lintern Corp., 50 Lincoln avenue, Berea, O. It consists of an arrangement of mechanical, activated carbon and electro static (Westinghouse Precipitron) filters combined in a compact assembly to completely treat all air entering the cab enclosure.

The equipment, it is reported, allows clear fresh air to enter the cab at the rate of one complete change per minute through a diffuser which efficiently prevents drafts. Where excessive heat complicates the health problem, mechanical cooling is provided.

For winter operation, the filtered air is electrically heated.

Brochure Gives Data on Metal Chilling Technique

To answer some of the questions regarding design and application of industrial type low-temperature apparatus for low temperature treatment of metal parts, Deepfreeze Division, Motor Products Corp., 2301 Davis street, North Chicago, Ill., has published a booklet entitled "Facts and Information About Industrial Chilling Equipment."

The equipment dealt with is capable of chilling metal parts to temperatures as low as 120 degrees below zero Fahr.—either for shrinking to permit easy assembly or as a treating process which will produce combinations of hardness, strength and ductility not obtainable by conventional hardening and tempering methods.

Copies of this brochure are available from Deepfreeze Division to engineers, metallurgists, production managers and other industrial executives who make application on their company letterheads.

TWO WEEKS' DELIVERY

Johnson Furnaces

No. 575 Pot-Hardening Furnace with Outstanding Features

Lid-lifting mechanism raises the lid easily and locks it in UP position.

Heavily insulated with 8 inches of quality hi-temperature insulation.

The pot size of No. 575 is 14 inches in diameter by 20 inches deep. The burners, located near top of combustion chamber, insure longer pot life. Vent damper regulates flow of exhaust gases. The top ring, in 3 sections, prevents cracking or distortion. Use with a larger blower for maximum performance. Price, $315.00 F.O.B. Factory — Blower Extra.

No. 130 A Johnson Heat-Treating Furnace

Notice the counter-balanced door which opens upward, allowing tools to be put in or removed without fully opening furnace door — thus preventing temperature drops. Carbofrax hearth and ¼ h. p. blower. Lined with hi-temperature insulating refractory. Available in 4 or 6 burner styles. 4-burner job pictured has temperature range from 1400 to 2000 degrees F., and is priced at $295. F.O.B. Factory. 6-burner job offers 1800 to 2400 degrees F., priced at $325. F.O.B. Factory. Firebox 7¾" high, 13" wide, 16½" long.

JOHNSON GAS APPLIANCE CO.

591 E Ave., N.W., Cedar Rapids, Iowa

Free NEW JOHNSON CATALOG
WRITE ADDRESS ABOVE

Arranging Shifts

(*Concluded from Page 126*)

recreation late in the evening as it would enable them to stay up to or beyond midnight and sleep later in the morning.

The White shift will appeal to middle-aged individuals whose social life has altered. As their children have all grown up they would not be disturbed while sleeping during the forenoon hours. They would have the afternoon free as they would not be due to begin work until 8 p.m.

The Blue shift fits in very well with the schedules of families of the intermediate age groups, where there are small children. The father could go to bed early in the evening at the children's retiring time. He would return from work shortly after noon and have the afternoon free.

With five 8-hour working shifts per week, the problem of the weekly holiday of 2 days may have an upsetting effect on the establishment and maintenance of the displacement cycle. Workers can hardly be expected on their days off to stay up during the odd hours which they devoted to work during the 5 days preceding. One answer to this problem is to decrease the weekend break to 1 day. The 48-hour 6-day work week is coming where it has not yet been adopted.

Plan for 10-Hour Shifts: Some industries may find it impossible to run their machinery continuously and may have to adopt two 10-hour shifts. These shifts could be distributed as follows:

A. The early shift from 4 or 5 a.m. to 2 or 3 p.m.

B. The late shift from 2 or 3 p.m. to midnight or 1 a.m.

By this arrangement no one would be expected to work during the early morning hours of greatest inefficiency. The shifts could be steady or of infrequent rotation.

In conclusion, these two important factors must be kept in mind: 1. Workers should stay on any shift long enough so that they can get used to it and live reasonably adjusted lives while they are on it.

2. The shifts should be timed in such a way as to result in only the minimum displacement of the normal 24-hour cycle of activity.

ACP Products and Processes CONTRIBUTE in Record Steel Production

With steel mills throughout the land straining for peak production, the savings in steel and acid made possible by RODINE are more important than ever before. Also of great importance now is the safety factor provided by RODINE. It prevents over-pickling and scrapping of finished steel under the pressure of the rush to produce.

Other ACP Products and processes are lending a hand, too. CUPRODINE is used to produce a dense, bright copper coating on steel by a simple immersion (non-electrolytic) process in wire mills and on steel shell cases before drawing. RIDOLINE and the ACP Alkali Cleaning System cleans strip and plates in a continuous operation to speed-up production and provide better finishes.

•

These Products and Processes are, however, only typical of the many contributions ACP can make to your production goal.

Others include: DEOXIDINE to prepare steel, aluminum and dural properly for painting; FLOSOL the exceptional soldering flux; KEMICK for painting metals subject to high temperatures; LITHOFORM to coat galvanized iron to hold paint.

Let the quarter-century of experience that has made ACP Products and Processes known the world over help you solve the problems of today's production . . . no matter what your metal treating and finishing needs.

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Chicago Vitreous Offers Priority-Free Finish

A new priority-free coating for metal products recently developed by the laboratories of the Chicago Vitreous Enamel Product Co., Cicero, Ill., is reported to enable manufacturers to substitute steel or iron in their products for the even more critical materials such as brass, copper, stainless steel and aluminum. Its use is expected to relieve the pressure on vital materials used for protective coatings such as chromium, zinc, tin, cadmium, as well as critical materials in some organic finishes.

The new finish, or coating, called Armor-Vit, is at once a material and a process. While the trade-name suggests a material ceramic in nature, there is no relationship between the development and porcelain enamel, and being inorganic, no comparison with paint, lacquer, or the synthetic finishes, the company explains.

The finish is essentially an alkali alumina silicate, one source of which is a new ingredient, an oil-bearing halloysite from the only known deposit in the world. There are various types of halloysites, but this particular halloysite is black and oil-impregnated, which characteristic lends immeasurable benefit to the finished material. After the application of Armor-Vit, by ordinary spraying equipment or dipping method, the curing treatment, best accomplished in an indirect-fired, air oven, combines the ingredients of the coating into a hard, heat-resisting finish, insoluble in boiling water and highly resistant to most acids and alkalies.

For its application the metal is cleaned

by ordinary cleaning methods—alkali cleaner, and pickling and then neutraliz. ing.

Sand-blasting is usually recommended for cast iron. The product is said to make an exceptional rust or corrosion resistant finish for metal It repeatedly proved its ability to withstand the standard 200-hour salt spray test, extended weather-ometer tests, and all manner of acid and alkali tests with excellent results, says the company.

Impact and abrasion also is capably endured by this new finish, conclusive evidence being found in its application to steel skid-boxes used for transporting 37 millimeter shot in a certain annealing plant.

After eight months of handling these rough shot, both cold and piping hot, the coating was still in good condition.

Suggests How To Clean Gas Welding Tips Speedily

A time-saving method for maintaining brass or copper gas welding and flame cutting tips is suggested by Oakite Products Inc., 22 Thames street, New York. Indirectly, the method is reported to speed production while cutting maintenance time in half.

After a period of normal use, tips acquire a deposit of carbon, slag, scale and tarnish. Orifices become congested or clogged, a condition which usually prevents utilization of correct pressures. When operating efficiency is thus affected, often gas is wasted. What then, is the best way to handle this work on a fast production and safe basis?

The experience of one metal-working concern points the way and may serve as a guide to others, particularly to those plants where a large amount of welding and cutting is done and where tips are reconditioned or handled on a daily basis.

Usual method for handling this work is to employ drills to open and clean orifices so that oxygen stream has clean passage, then buff and scrape surfaces of tips to remove traces of carbon, scale and tarnish. In one instance where a large volume of this work is handled, it usually required the time of four workers for 7 hours to clean 200 tips.

With the new method, 500 tips are cleaned in 3 hours which cuts in half the time previously required for this work. The new technique only requires the time of one individual, releasing others for different work.

Sequence of cleaning steps is as follows:

Tips are placed in basket and immersed in boiling cleaning solution for 45 minutes to one hour, followed by cold

America's Light, Medium and Heavy Tanks have

FORGINGS BY STANDARD

War being the supreme test of materials and workmanship, it is again proving that Standard's reputation for dependable steel products, gained in time of peace, and other wars, is well deserved.

With its roots implanted, back in 1795, in the beginning of our Nation's history, Standard is today using the accumulated knowledge and experience of the intervening years to produce highest quality forgings and castings for equipment of our armed forces on land and sea, for war-time industry, and for the railroads.

The metallurgists and other trained personnel of Standard are acquiring added skill in meeting war-time demands that will be applied to industrial and transportation problems in the post-war period wherever quality steel forgings are required.

STANDARD STEEL WORKS

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PHILADELPHIA

FORGINGS • CASTINGS • WELDLESS RINGS • STEEL WHEELS

rinse. Next, tips are immersed in solution of Oakite compound No. 32 to remove carbon, slag and scale deposits, followed by cold rinse. Tips then are given a 10-minute bright dip followed by cold rinse and boiling rinse to dry down with final air blow.

This sequence takes approximately 90 minutes after which tips are free of deposits that upset flame balance. Possibility and mechanical injury to tips such as may occur by using wire cleaners or drills is avoided and tips come out of solution clean, bright, looking like new inside and out.

Pratt & Whitney Replaces Steel Trays for Wood

To conserve steel and to make work lighter for its increasing number of women employes, Pratt & Whitney Aircraft Division of United Aircraft designed wooden containers as substitutes for steel trays used for parts in process.

Even without a load of knuckle pins, gears, piston pins, articulating rods, bushings or studs, according to the company, the old trays were heavy for a woman to handle.

The new tray has metal bound wooden sides and ends, and a plywood bottom which can be replaced when necessary by withdrawing eight rivets. Box grade $\frac{3}{16}$-inch hardwood plywood and scrap metal salvaged from punch press operations are used.

The metal corner bindings were turned under the bottom for strength. Metal buttons which allow the trays to be stacked without danger of falling or slipping are on the ends of skids which extend under the four sides. Hinged metal handles and wooden or corrugated cardboard partitions to fit different parts complete the design.

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NATURAL GAS
TIME IS SHORT!
Change to the Victory Fuel now!
AMCO
PULVERIZED COAL
Systems
with automatic control
for HEATING MELTING AND ANNEALING
Fuel oil and gas must be replaced now with pulverized coal, if operations are to continue at their present record rate. • AMCO is prepared to furnish complete Pulverized Fuel Systems for all types of furnaces in the Steel and Non-Ferrous Industries.
The AMSLER-MORTON Company
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ASTM Issues Latest Book of Standards

More than 1000 specifications, tests, definitions, etc., covering engineering materials and products, are included in the 1942 book of ASTM standards recently published by the American Society for Testing Materials, 260 South Broad street, Philadelphia. These are presented in their latest approved form as of December 1942.

One of industry's most important books—issued in three parts—the latest edition has 1090 specifications and standard methods which cover more than 4900 pages.

Continuing the policy first used with the 1939 book, the latest edition gives all specifications, whether formal standards or tentative. Each part of the 1942 edition contains a complete subject index. The part II index, for example, covers 32 pages, and there are two extensive tables of contents, the first lists all standards under general materials headings: the second lists them in order of the sequence of the serial designations. These features are intended to facilitate reference to any subject covered.

To keep the books up to date in 1943 and 1944, a supplement will be issued to each part in each of these years, the society reports.

Develops One-Coat Finish for Masonry

One coat of Colorthru, a new product recently developed by Colorthru, 20 West Forty-fifth street, New York, is reported to finish in color concrete, brick, stucco, cement, etc., whether inside or out, painted or unpainted. It can be applied to old or new masonry even when wet it is said.

Brushed or sprayed on, the coating is said to penetrate, waterproof and preserve. It is applied without priming or undercoat.

Helpful Literature

1. Metallurgical Analysis

E. H. Sargent & Co.—6-page illustrated bulletin, "High Speed Analysis of Metallurgical Products," is descriptive of "Slomin" electrolytic analyzers which are used for accurate, quantitative analysis of ferrous and nonferrous metals and alloys, electroplating solutions and electro-deposits, micro and semi-micro specimens, and similar materials. Scientific laboratory supplies are also covered.

2. Specification Finishes

Egyptian Lacquer Manufacturing Co.—44-page illustrated manual, "United States Government Specification Finishes," is third edition of this book. Army, Navy and Federal specifications of lacquers, enamels, primers, paints, varnishes and other protective coatings are given. Material, colors, thinning, application and drying time are covered.

3. Munitions Engraver

George Gorton Machine Co.—8-page illustrated bulletin No. 1635-A presents details regarding design and operation of model ME pantograph type munitions engraving machine and "Spit-fire" electric arc etching unit which can be used in conjunction with engraving machine. Typical applications of this equipment for etching or engraving all types of materials are shown.

4. Fastening Devices

John Hassall, Inc.—48-page illustrated catalog No. 40 presents complete specifications on line of cold forged specialties, special nails, copper nails, escutcheon pins, special rivets, Annular thread screws, drive screws, fluted and knurled products, machine screws, and related products of ferrous and nonferrous alloys and metals. Also available is 16 x 18-inch wall chart containing decimal equivalents of fractions up to 1 inch.

5. Roll Grinder

Farrel-Birmingham Co.—32-page illustrated bulletin No. 113 describes design, construction and operating advantages of type TT roll grinder with moving work table, which is used for producing accurate finish on rolls, cylinder and shafts. Machines are built in three sizes to take maximum diameters of 24, 28 and 32 inches and in any length required.

6. Tool Shanks

Cooper-Bessemer Corp.—12-page illustrated bulletin No. 53T-2 contains description and specifications on "Victory" tool shanks which are cast to shape. These shanks are designed for tipping with carbide by users who manufacture their own cutting tools. In addition to complete line of shanks, forming tools are also available cast to shape with Meehanite.

7. Carburizing Furnaces

Surface Combustion—4-page illustrated bulletin No. SC-108 is descriptive of continuous type gas carburizing furnaces. Design features of this equipment include radiant tube firing, simplified materials handling, and automatic, semi-automatic or manual control.

8. Shift Calculator

George S. May Co.—Dial type calculator is designed to aid in selection of employe work program to obtain as near continuous operation of equipment as possible. This device is perpetual work shift schedule and single setting permits determination of starting and stopping time of three or four crews on rotating or swing shift schedules. Four separate plans are offered.

9. Welding Equipment

Liquid Carbonic Corp.—32-page illustrated bulletin, "Gasweld Welding and Cutting Equipment," presents complete details and specifications on welding torches, gas pressure regulators, standard and special welding tips, cutting tips, complete outfits, special equipment and accessories. Also described are motor driven flame-cutting machines. Price list is included.

10. Metal Stamping

Dayton Rogers Manufacturing Co.—20-page illustrated bulletin, "Metal Stamping in Small Lots," is compilation of data and description of production methods used in making limited stampings in small lots where cost of conventional dies would be almost prohibitive. In addition to showing facilities of this company, typical examples of parts produced are described.

11 Heat Insulation

Philip Carey Manufacturing Co.—24-page illustrated bulletin, "Heat Insulation For Industry," is descriptive of asbestos, diatomite, magnesia and rockwool insulations which are available in many forms for application to industrial equipment. Complete data are given regarding application and heat insulating qualities of various materials. Also covered are bonding, waterproofing and refractory cements, as well as pipe coverings and sheet insulating materials.

12. Pipe Threading

A. M. Byers Co.—30-page illustrated service bulletin, "The Threading of Wrought Iron Pipe," is instruction manual on wrought iron pipe threading. In addition to covering fundamentals of threading practice, exact instructions are given regarding chaser sharpening and correct threading procedure. Defects in threads and their causes are also covered.

13. Machine Tools

Cincinnati Milling Machine Co., Cincinnati Grinders Inc.—48-page illustrated catalog No. M-995-1 is descriptive of machines for milling, broaching, die sinking, grinding and lapping. Complete specifications are given on various models of machines within these categories. Design features of available units are also covered.

14. Roofing Material

Coated Products Corp.—6-page illustrated folder, "Introducing Flastipitch," is descriptive of process of weather proofing many types of metals and shapes. This method is claimed to replace galvanizing and rolled methods of bituminous application. Coating protects corrugated metal sheeting and roofing against action of water, sunlight, smoke or acid.

15. Adhesive Cements

Cataract Chemical Co.—2-page illustrated data sheet No. G1142 discusses various types of cellulose solutions which are available as adhesive cements for permanent or temporary bonding of wood, leather, fiber, cloth, glass, plastics, metals and other materials. These cements are available in waterproof, oil proof, heat proof and non-conductive types. Also covered are thinners and activators.

16. Parts Refrigerating

Deepfreeze division, Motor Products Corp.—12-page illustrated manual, "Facts and Information About Deepfreeze," gives pertinent data regarding low temperature industrial chilling equipment. Uses and general application in all types of industry are covered. Supplementary booklets describe equipment and present technical article on effect of subatmospheric temperatures on high speed steel.

17. Drilling Machine

Bryant Machinery & Engineering Co.—16-page illustrated catalog No. 400 is descriptive of "Cleereman" drilling machines which are designed and constructed for high speed, accurate work. Line includes drilling, boring and tapping machines with capacities ranging from 3/16 to 6-inch diameter holes. In addition to giving specifications on various models, features of construction are shown.

18. Steel Castings

Elmco Corp.—36-page illustrated bulletin No. 801 describes facilities of affiliated companies which offer complete repair and replacement service in production of electric furnace steel castings. Characteristics and details of carbon-steel, alloy steel, iron and nonferrous castings, as well as machining, heat treating, forging and fabrication services are described.

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19. Drilling Machine

Davis & Thompson Co.—2-page illustrated data sheet on "Roto-Matic" driller shows design and operation of this type 8SV multiple spindle vertical drilling machine which has capacity of up to eight ⅛ to ⅝ inch drills in steel. Use of pick-off gears permit spindles to be run at any speed ranging from 800 to 2400 revolutions per minute. Machine is also available in larger sizes.

20. Snagging Wheels

Bay State Abrasive Products Co.—4-page illustrated folder, "Portable Snagging Wheels," is descriptive of various types and sizes of these abrasive wheels which are designed for use on all types of portable grinding equipment. Table lists recommended wheels for snagging operations on aluminum castings, brass and bronze, gray iron, forgings, malleable castings and manganese steel castings.

21. Testing Equipment

Baldwin Southwark division, Baldwin Locomotive Works—16-page illustrated bulletin No. 153 contains descriptions of strain gages and extensometers. Typical records obtained with "De Forest" scratch recording strain gage are shown. Various types of extensometers are described in detail. Other types of testing equipment are covered briefly.

22. Hydraulic Equipment

Blackhawk Manufacturing Co.—12-page illustrated catalog No. V-43 lists only those items of hydraulic equipment scheduled for production during war. Covers hydraulic hand jacks, 3 to 50 tons capacity; wheeled service jacks; gage equipped jacks; "Porto-Power" hydraulic units; maintenance kits; motor vehicle assortments and pipe benders. Catalog replaces eight peacetime bulletins.

23. Speed Reduction Units

American Pulley Co.—16-page illustrated catalog No. R-43 describes line of reduction drives made in six sizes from ½ to 25 horsepower. With speed ratio of 13 to 1, they deliver any desired driven speed from 11 to 154 revolutions per minute. Line drawings show typical applications of these drives. Directions for selecting proper drive for specific use are outlined.

24. Bronze Alloys

Ampco Metal, Inc.—8-page illustrated booklet, "Supplementary Alloys for Uncle Sam", describes three bronze alloys having physical properties that meet certain definite requirements in war production. Booklet shows specifications met, physical properties and chemical compositions of these alloys. Bronzes are laboratory controlled.

25. Piping Construction

Crane Co.—8-page illustrated folder No. 6 is one of a series of bulletins on "Piping Pointers." It is entitled, "Short-Cuts to Faster Piping Jobs," and points out examples of how material shortages can be overcome through ingenuity on part of designer or erector. Various suggestions are illustrated and explained in text.

26. Bronze Bushings

Atlas Brass Foundry Inc.—84-page illustrated catalog No. 35 gives complete specifications on standard and special bronze bushings, bearings, phosphor bronze cast bars, babbitts, "Compo" oil-retaining bearings, "Powdiron" sintered iron parts and bearings, pillow blocks, and special castings and bushings of nonferrous alloys.

27. Refractories

Babcock & Wilcox Co.—Illustrated data sheet, "Guide for Mortars and Plastics," is designed to simplify problem of selecting correct refractory materials for wide range of applications. Various types of work are listed along with suggested materials and their maximum temperature range.

28. Platform Trailers

Easton Car & Construction Co. — 1-page illustrated bulletin No. 191 describes and gives brief specifications on standard warehouse, pneumatic and solid tired, and cradle type platform trailers in capacities ranging from 1000 to 4000 pounds. Details of automatic coupler and its operation are discussed.

29. Coolant Filtration

S. G. Frantz Co.—4-page illustrated bulletin, "Magnetic Filtration of Coolants," discusses use of "Ferrofilters" in manufacture of small arms. Application of units to various types of machine tools employed in arms production are described. Specifications are given on available sizes of these magnetic filtering units.

30. Bearings

Bantam Bearings Corp.—24-page illustrated bulletin No. 104 presents full specifications on "Bantam" needle, ball thrust and roller thrust bearings; quill rollers and cam followers. Complete information is given regarding application, design, capacity and speed of various types of bearings.

31. Crane Operation

Electric Controller & Manufacturing Co.—44-page illustrated instruction manual No. 930 is entitled, "How to Operate a Crane." It is intended for use in training new operators for crane service, supplementing standard training program which may be given at plant. Illustrations and text provide thorough understanding of crane operation procedure.

32. Inventory Control System

Diebold Safe & Lock Co.—8-page illustrated bulletin No. 601-204 presents detailed information regarding "Cardineer" system for record keeping in conjunction with inventory control. All card records are instantly accessible on large wheel type file. Various forms which are available are described.

33. Deaerating Equipment

Cochrane Corp.—36-page illustrated booklet No. 3005 covers tray type deaerators, atomizing deaerators, deaerating hot water generators and cold water deaerators. Bulletin contains flow diagrams and photographs of installations described. Corrosion control and pH control are discussed. Accessory equipment is included.

34. Welding Electrodes

American Agile Corp.—two illustrated bulletins are descriptive of "Agile" welding electrodes. "Silver-Green" electrodes are designed especially for tipping of shock resisting tools. "Silver-Red" electrodes are produced for construction of high-grade cutting edges on medium and low carbon steels. Instructions for welding with both types of electrodes are outlined. Prices per pound are shown.

35. Adjustable Stud Setters

Apex Machine & Tool Co.—4-page illustrated bulletin No. 101 describes "Apex" adjustable stud setters. Four sizes cover range of studs up to 1¼ inches. Setters are available in taper shanks, hexagon, T-handle, square female or T-handle combination with square female drive for use with torque wrench. Specifications for stud setters and their repair parts are listed.

36. Colloidal Graphite

Acheson Colloids Corp.—12-page illustrated bulletin No. 430-AZ discusses importance of "dag" colloidal graphite to modern industry. It describes physical and chemical properties of this product and shows how it differs from other forms of graphite, especially in regard to particle size. Control of dispersions and reasons for liquid carriers are explained. Bulletin summarizes all standard colloidal and semi-colloidal dispersions and illustrates several typical applications.

37. Plastic Parts

Creative Plastics Corp.—4-page illustrated broadside advocates production of critical parts in plastics without molds. Plastic parts illustrated include generator cover plate, transparent locking device, plug for valve, gear knob, indicator handle, internal-external threaded coupling, threaded tube section, heater bushing, commutator brush holder and telephone coupling.

38. Electric Furnaces

Cooley Electric Manufacturing Corp.—4-page illustrated bulletin No. 50 is descriptive of electric furnaces for industrial and laboratory uses. Furnaces are recommended for fast heat treating of small parts, drawing or tempering small lot small parts, normalizing or annealing small parts, pre-heating for subsequent high speed hardening and emergency repair orders where one or two parts must be heat treated in short time. Specifications and prices are listed.

39. Care of Centrifugal Pumps

Allis-Chalmers Manufacturing Co.—28-page illustrated manual, "Handbook for Wartime Care of Centrifugal Pumps", is part of series which already includes books on wartime care of motors and V-belts. It applies to all makes of pumps and contains no advertising. Guide makes specific recommendations for putting pump care on wartime basis. Tips included in book describe easy ways to find leaks, common mistakes in packing stuffing boxes, role of water as lubricant in pumps and many others.

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Mirrors of Motordom . . .

(*Concluded from Page* 82)

has made the statement that iron and steel will continue to be the basic materials for automobile construction because they alone provide the necessary stiffness or rigidity of the assembly.

It must not be denied that there are literally hundreds of applications for both plastics and the light metals in motor cars—uses which complement the basic structural materials, iron and steel. There will be a speedy and fairly complete acceptance of newer materials in such parts, but the pressure on cost will unavoidably be tremendous. Those who have worked with the motor plants in the supply field over the past 20 years will attest the importance of a few cents in the unit cost of a car. Many otherwise worthwhile improvements proposed for motor car use have been rejected because they involved what appeared an insignificant increase in cost per car; a premium which would grow to a major item when multiplied by a million or two, which is after all the final test—the net effect on annual production costs, not "per car" cost.

But enough of the generalities; next week we will turn to a detailed analysis of the component parts of an automobile and attempt to see what may be in store for the future.

Minerals Distribution To Affect Future Peace

(*Concluded from Page* 98)

world's minerals. By the close of 1942, they had acquired control of additional areas that in 1939 had produced 14 per cent. While serious inroads have been made into the United Nations' supplies, especially steel and oil, by Germany and Japan, the output available to the United Nations is still enormously greater than that to adversaries.

Great inequality in the distribution of minerals, which for many years has given rise to international rivalry and controversy, is not likely to be changed materially by new discoveries or technological developments. As the growth of industry calls for larger and more varied supplies, there will be a greater concentration of demand on large reserves now in production or known to exist.

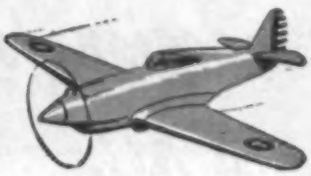
Since World War I, many nations have adopted closed door measures designed to restrict exploitation of natural resources by outsiders, but they have not denied the "have-not" nations' access to minerals. On the contrary, in peacetime producers made great efforts to sell to countries that now are enemies.

Real difficulty facing the Axis powers with respect to minerals before the war was their inability to pay for imports. Costs of long distance transportation were a primary factor in raising the price of their mineral imports. Their payment problem was complicated by exchange depreciation resulting either from general economic, financial, and trade dislocations or from internal policies of the importing nations. In late years payment became especially difficult because they were importing minerals in large quantities while reducing exports—both in anticipation of war.

The study explores the possibility of using mineral controls as part of a program to maintain peace by collective action on the part of the chief mineral producing nations and points out the difficulties involved. Conflicting claims of self-interest would arise within such a controlling group. It would be difficult to obtain close co-operation of all the mineral producing countries.

It would be necessary to supervise not only the total imports of the various countries but also the uses to which the minerals are put. Since practically all branches of industry are potentially useful for war purposes, far-reaching extension of such controls might be required.

FOR THE MOTORS THAT POWER OUR FIGHTING PLANES



● No part in the production of combat equipment can be considered lightly. In the construction of the modern and efficient engines that power many of our fighting planes the special bronze bearings are poured in MICHIANA Pots. While this is a relatively small part, we at MICHIANA are proud of the responsibility and ready to do our utmost to insure the long heat-hour service needed to maintain high production and few delays.

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MICHIGAN CITY, INDIANA

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Heat-Resistant and Corrosion-Resistant ALLOY CASTINGS

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• Sprockets • Chains
• Heat-Resistant and Corrosion-Resistant Castings of All Kinds

A coil may develop a spring in a reptile, but in metal it takes coils of SCIENTECH design to make a spring a hit.

LEE SPRING COMPANY, INC.
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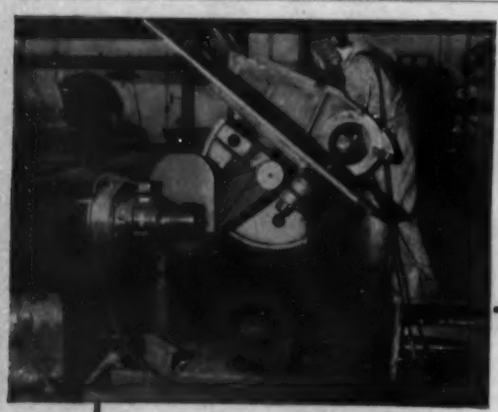

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Speed Production and Job Welding

C-F Positioners make welding a faster and more economical operation—save time, save man-hours. The welder himself turns and tilts and positions even the clumsiest and heaviest weldments with a push button control—without cranes, crane crews, hoist, jacks or "flopping" space. All sides can be welded down-hand—all welds can be made faster with heavier rods; made stronger, smoother and flawless.

Write for Bulletin WP 22.

C-F Positioners come in sizes and types for every welding need—range from small hand operated units for light job work to giant positioners that swing great weldments weighing 30,000 lbs. All have platforms that rotate the full 360° and tilt to 135° beyond horizontal. All are adjustable for height and are pedestal mounted to give greatest floor clearance.

CULLEN-FRIESTEDT CO.,
1308 S. KILBOURN AVE. CHICAGO, ILLINOIS

WPB-OPA Rulings

(Concluded from Page 79)

telephone, to ratings of AA-4 or higher, except for previously accepted orders.

PRICE REGULATIONS

No. 77 (Amendment): Beehive Furnace Coke, effective April 6. Provides that beehive oven furnace coke produced in Monongalia, Preston and Upshur counties, W. Va. be priced under same price regulation as that for coke produced in Pennsylvania. Ceiling price for hand-drawn coke whose coal must be trucked from mine is $7 per net ton f.o.b. Connellsville, Pa. Transportation charges from Connellsville to place of delivery may be added. Machine-drawn coke is priced at $6.50 a ton on same basis.

No. 121 (Amendment): Miscellaneous Solid Fuels, effective April 6. Exempts beehive oven furnace coke produced in Monongalia, Preston, and Upshur counties of W. Va. Coke produced in these counties is subject to price schedule No. 77.

No. 136 (Amendments): Machines, Parts and Machinery Services, effective April 8, specifically includes non-electrical welding equipment including welding rods, welding wire, electrodes and supplies in list of items covered by regulation.

Effective April 8, changes status of items under the regulation: Covers only power-operated marine and industrial soot blowers and tube cleaners (hand-operated devices covered by regulation No. 188); excludes ladles over 40 tons' capacity from definition of "foundry equipment" (these ladles covered by General Maximum Price Regulation); excludes space heating furnaces and stoves, (covered by Schedule No. 188) blast furnaces, open hearth furnaces, Bessemer converters, soaking pits, coke ovens, and industrial furnaces used solely for manufacture of pig iron (subject to General Maximum Price Regulation).

Effective April 10, provides alternative ceiling for used machinery and second-hand machine parts. Ceilings can be determined either (1) by using 85 per cent of the maximum price for nearest new equivalent machine f.o.b. factory, for a reconditioned and guaranteed machine or part; or 55 per cent of maximum price for nearest new machine, for an "as is" or other machine not guaranteed nor rebuilt; or (2) by using maximum price for nearest equivalent new machine and reducing it by depreciation rate listed in a table now contained in the regulation from the date of acquisition when new to date of sale. Provisions are also made for sale of machinery leased by Defense Plant Corp.; for sales between corporations entitled to file affiliated returns under Internal Revenue Code; and for sales of machines sold only on a delivered or installed price.

Effective April 12, provides manufacturers of steam cleaning equipment, degreasing machines, metal washer parts, manufacturers' optical processing machinery with a pricing formula.

No. 202 (Amendment): Brass and Bronze Alloy Ingot and Shot, effective April 12. Establishes maximum price for shot, including shot in granulated form, of any alloy that contains 50 per cent or more by weight of copper that is in line with maximum price established by the regulation for the comparable ingot, adjusted for difference in manufacturing costs. When a price for shot is filed with OPA for approval, it may be effective at once in transactions of the seller; but if the price is disapproved, settlements must be adjusted to an amount no greater than the price that is established by OPA.

No. 356: Royalties on Copper, Lead and Zinc Ores, effective April 1. Freezes royalties paid by domestic mine operators at rates in effect Dec. 31, 1942. Does not affect royalties based on original premiums of the Premium Price Plan, amounting to 5 cents per pound for copper and 2.75 cents each for lead and zinc, unless these premiums were not included in royalty calculations last year.

MEETINGS . . .

Forum Hears Machine Tool Market Is Declining Rapidly

PITTSBURGH

Indications of changing conditions in machine tool markets were noticeable at the eighth annual machine tool electrification forum here last Tuesday and Wednesday under sponsorship of Westinghouse Electric & Mfg. Co. Nearly 300 representatives of companies with more than 90 per cent of the industry's capacity were represented at the two-day session, this attendance being more than double the previous high record.

Informal and behind-the-scenes discussions were indicative of the growing concern manifested by the industry over the rapid drying up of markets. General consensus was that future business from the war effort will be only a small trickle in comparison to the industry's capacity to produce. Unless there is an early end to the war, with consequent conversion to peacetime products, little new business can be expected. One large machine tool buyer said that current business being placed with machine tool builders had dropped to about 40 per cent of last year's figure and was declining even more rapidly.

A more extensive report of the meeting will be published in STEEL's issue of April 19.

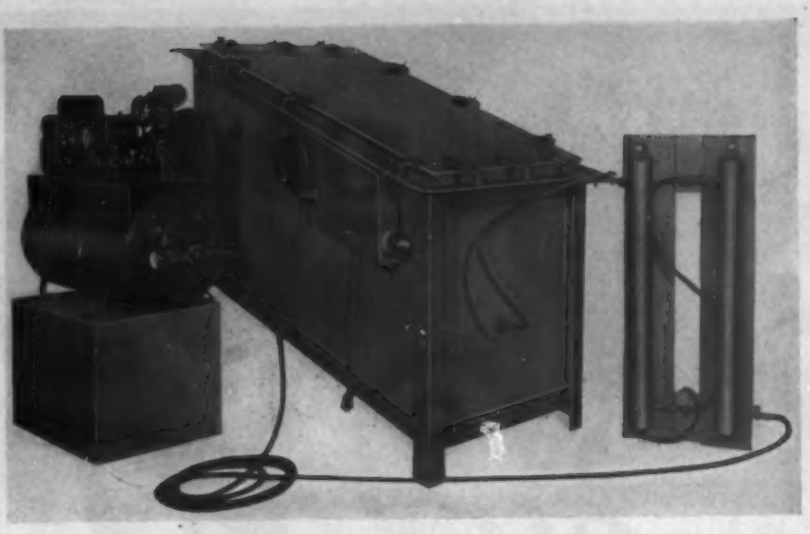
Blast Furnace, Open Hearth Sessions To Be in Cleveland

Annual conference of the National Open Hearth Committee and the Blast Furnace and Raw Materials Committee of the American Institute of Mining and Metallurgical Engineers will be held in Hotel Statler, Cleveland, April 29-30.

Basic open-hearth technical session will begin April 29 with a discussion of personnel from 10 a. m. to noon. From 1:30 to 3 p. m. talks on refractories and furnace maintenance and open-hearth furnace operation will be given. On Friday the session will continue with discussion of raw materials, quality of steels, and maintenance of acid open-hearth furnaces.

Blast furnace and raw materials technical sessions will open Thursday with a discussion of raw materials. Blast furnace construction session will be Friday morning. Blast furnace operation will be the subject of discussion from 2 to 5 p. m.

L. F. Reinartz is chairman and A. P. Miller vice chairman of the open hearth committee. The blast furnace and raw materials committee is directed by Peter F. Dolan, chairman, and B. M. Stubblefield, vice chairman.



The **MUNNING SALT SPRAY TEST EQUIPMENT**
for determining Resistance to Corrosion

The salt spray method is the most practical for ascertaining the value of electro deposited articles by testing for corrosive resistance of the base metal and permeability of the plated coating.

This Munning Improved Model shown above conforms to army, navy and aeronautical specifications, and is recommended for producing accelerated corrosion tests to simulate service behavior.

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PRECISION HYDRAULIC CYLINDERS SOLVED THIS PROBLEM

This 11 in. bore x 66 in. stroke Hannifin hydraulic cylinder was built for tilting an electric furnace. The strong, simple, no-tie-rod design and Hannifin precision construction insure simple application, and high efficiency operation with maximum usable power. Even in this large size the cylinder bore is honed to produce a mirror finish, straight, round and concentric. Efficient piston seal assures minimum fluid slip.

Hannifin Cylinders are built in a full range of sizes and types, for working pressures up to 1000 and 1500 psi. Write for Bulletin 35-S giving complete specifications.

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HANNIFIN
HYDRAULIC CYLINDERS

THERE IS ONLY SO MUCH TOOL STEEL AVAILABLE!

Every time a tool is broken, that tool must be replaced if production is to continue. Today, it takes as much as six months to obtain tool replacements.

One of a series of 2⅓ by 3½ ft. 3-color bi-monthly posters, designed to help reduce tool breakage through worker education, made available to users of **"TOMAHAWK"** tools, without charge.

For complete information wire or write

GENESEE TOOL COMPANY
FENTON, MICHIGAN

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Little Interruption as Industry Shifts to CMP

DEMAND
Heavy in all lines.

PRODUCTION
Unchanged at 99½ per cent.

PRICES
Steady at ceilings.

Allotment numbers cover most orders now. . . Deliveries to show little change. . . Scrap supply meets steel needs. . . Larger freight car releases planned for last half

RELATIVELY little confusion is expected in passing from Production Requirements Plan to Controlled Materials Plan.

Indications are that practically all consumers who had rated orders definitely promised for second quarter delivery, as of March 22, will have them certified under CMP before April 15, when allotment numbers under the latter take precedence. Some sellers report that more than 90 per cent of their customers have supplied allotment numbers and the percentage for June rolling is expected to be even larger.

At the moment many large producers are making no delivery promises on new business, waiting until they can appraise the situation, but survey indicates they will have little capacity left, even in plain carbon products.

Current new orders for hot-rolled carbon steel bars stand little chance of being scheduled for rolling before June and, with average volume of allocations, probably little June capacity will be available. In larger rounds and flats second quarter rolling on new business is impossible except on directives. Cold-drawn bars are even tighter and August is about the best that can be offered on current contracts.

• • •

Fabricators able to obtain ship subassembly and other government work to replace their normal lines note considerable reduction in this demand as military bases, cantonments and similar projects are completed. Those situated near shipyards have plenty of prefabricating work. Tankmakers find their field yields little business but additional high-test gasoline and synthetic rubber plants may bring additional work of this character. Transition of plates entirely to CMP may be slower than in other products and may not be completed until June rollings or later. Plate distribution by allocations has been efficient and under smooth control for several months.

Wire specialties validated for delivery as early as possible this quarter, a large part of which require much processing, are sufficient to crowd considerable current CMP orders into late May or June schedules. By the end of second quarter wire orders probably will be entirely under the new plan. Considerable open-hearth steel is being used in place of electric-furnace material as the latter is not in sufficient supply. Demand for flat wire is less than for round. Rope mills are booked for maximum output for three months or more, ships accounting for a large part.

Steelworks operations last week maintained the rate of 99½ per cent set the preceding week. Changes were slight and resulted entirely from necessity of open-hearth repair. Chicago advanced 1 point to 101½ per cent, Youngstown 1 point to 98, Cleveland 3 points to 96 and Wheeling ½-point to 89 per cent. Pittsburgh declined 1 point to 100 per cent, Cincinnati 6 points to 85 and New England 5 points to 95. Rates were unchanged at Buffalo, 90½; St. Louis 93; Birmingham, 100; eastern Pennsylvania, 95; Detroit, 94.

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Scrap supply continues to support the high rate of steel production, though in some areas melters find too large a proportion is light and inferior material. Use of tonnage from reserves continues in some cases but not to a serious extent. Many yards are working at a low rate because of labor shortages and effects of this condition may be more apparent in supply later. Turnings continue a problem and considerable accumulations are building up in spite of efforts to move them. Consumption of scrap is heavy, the average daily rate in February being greater than in January, and February melt was the largest in history for that month.

Advices from Washington indicate means are being sought to provide for about 44,000 domestic freight cars for construction in last half to relieve urgent need of the carriers. This total is far short of the number estimated earlier in the year as necessary. With the 20,000 released for first half construction the aggregate of 64,000 cars compares with about 26,000 built in 1942.

No shortage of manganese ore is likely as reserves have been built up until an estimated 2,000,000 tons is available, nearly two years' supply. Recent shipments from West Africa have been above normal, attributed to vessel space made available by munitions movement to that continent. Both private buyers and the Metals Reserve Corp. are involved in building up stocks.

Composite average prices of steel and iron products have undergone no change under Office of Price Administration ceilings, finished steel composite being $56.73, semifinished steel $36, steelmaking pig iron $23.05 and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	Apr. 10	Apr. 3	Mar. 27	One Month Ago Mar., 1943	Three Months Ago Jan., 1943	One Year Ago Apr., 1942	Five Years Ago Apr., 1938
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$62.00
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	40.00
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	23.02
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	12.60

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	April 10, 1943	March 1943	Jan. 1943	April, 1942
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.49	2.49	2.49	2.49
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.22	2.22	2.22	2.22
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron	April 10, 1943	March 1943	Jan. 1943	April, 1942
Bessemer, del. Pittsburgh	$25.19	$25.19	$25.19	$25.19
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.39	25.39	25.39	25.39
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.30	24.30	24.30	24.06
No. 2X, del. Phila. (differ. av.)	26.265	26.265	26.265	26.265
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.54	31.54	31.54	31.54
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.65	140.65	140.65	125.63

Scrap				
Heavy melting steel, Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke				
Connellsville, furnace, ovens	$6.50	$6.00	$6.00	$6.00
Connellsville, foundry, ovens	7.25	7.25	7.25	7.25
Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.

(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

Alloy Steel Ingots: Pittsburgh, uncropped, $45.00.

Rerolling Billets, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36.25; Duluth (bil.) $36.00.

(Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire, Co. $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives.)

Forging Quality Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40.00; Detroit, del. $42.25; Duluth, $42.00.

(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points.)

Open Hearth Shell Steel: Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., $52.00; 12-18 in., $54.00; 18 in. and over, $56.00.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54.00.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., $1.90.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—9/32 in., inclusive, per 100 lbs., $2.00.

Do., over 9/32—47/64-in., incl., $2.15. Worcester add $0.10; Galveston, $0.27. Pacific Coast $0.50 on water shipment.

Bars

Hot-Rolled Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.51c; Phila. del. 2.49c; Gulf Ports, dock 2.52c, all-rail 2.59c; Pac. ports, dock 2.80c. (Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points. Joslyn Mfg. Co. may quote 2.35c, Chicago base. Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced in its 8-inch mill.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.82c.

(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.55
		(.20-.30 Mo)	0.60
2300	1.70	4340	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.70	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.47c.

Turned, Ground Shafting: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.72c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.

(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila. del. 2.28c; New York del., 2.35c; Pacific ports 2.65c.

(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.17c; New York del. 3.41c; Phila. del. 3.39c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c; Phila. del. 3.68c; Pacific ports 4.05c.

(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

Enameling Sheets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage.

base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.

Electrical Sheets, No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	.....
		7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.22c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.92c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box $4.50.

Tin Mill Black Plate. Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.30-2.55c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c.
(Granite City Steel Co. may quote carbon plates 2.35c. f.o.b. mill. Central Iron & Steel Co. 2.20c, f.o.b. basing points.)

Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c.

Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.28c; Phila., del., 2.22c; Gulf ports, 2.47c; Pacific ports, 2.75c.
(Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points and 2.50c, Phoenixville, for export.)

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

Bright basic, bessemer wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Wire Products to the Trade:

Standard and Cement-coated wire nails, polished and staples, 100-lb. keg	$2.55
Annealed fence wire, 100 lb.	3.05
Galvanized fence wire, 100 lb.	3.40
Woven fence, 12½ gage and lighter, per base column	.67
Do., 11 gage and heavier	.70
Barbed wire, 80-rod spool, col.	.70
Twisted barbless wire, col.	.70
Single loop bale ties, col.	.59
Fence posts, carloads, col.	.69
Cut nails, Pittsburgh, carloads	$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

	Butt Weld Steel Blk.	Galv.	Iron Blk.	Galv.
In.				
⅛	56	33	24	3½
¼ & ⅜	59	40½	30	10
½	63½	51	34	16
¾	66½	55	38	18½
1-3	68½	57½	37½	18

	Lap Weld Steel Blk.	Galv.	Iron Blk.	Galv.
In.				
2	61	49½	23	3½
2½-3	64	52½	28½	10
3½-6	66	54½	30½	12
7-8	65	52½	31½	14½
9-10	64½	52	33½	18
11-12	63½	51	32½	17
			28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2½"	12	16.01	18.45	15.16	.....
2¾"	12	17.54	20.21	16.58	26.57
3"	12	18.39	21.42	17.54	29.00
3½"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., .fo.b. mill, gross ton, $40.00.
Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.
*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.
Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base. per lb.
18.00	4	1	-	67.00c
1.5	4	1	8.5	54.00c
	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
311	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
*317	50.00	54.00	58.00	50.00	58.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
442	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	26.00	32.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	.....	§§18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices; wasters 75%, waste-wasters 65%, except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co, on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller	65½ off
Do., ⅝ and ⅞ x 6-in. and shorter	63½ off
Do., ⅞ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex.	U.S.S.	S.A.E.
⅞-inch and less	62	64
⅛-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
½-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

	Price Per Net Ton
Beehive Ovens	
Connellsville, furnace	*6.50
Connellsville, foundry	7.50- 8.00
Connellsville prem. fdry.	7.75- 8.10
New River, foundry	8.50- 8.75
Wise county, foundry	8.00
Wise county, furnace	7.00
By-Product Foundry	
Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	†12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

*Operators of hand-drawn ovens using trucked coal may charge $7.00, effective Feb. 3, 1943. †$12.75 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha	
Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do. tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.62	26.12	27.62	27.12
Brooklyn, N. Y., del.	27.65	....	....	28.15
Birdsboro, Pa., del.	25.00	24.50	26.00	25.50
Birmingham, base	†20.38	†19.00	....	....
Baltimore, del.	25.67	....	....	....
Boston, del.	25.12	....	....	....
Chicago, del.	†24.47	....	....	....
Cincinnati, del.	24.30	22.92	....	....
Cleveland, del.	24.12	23.24	....	....
Newark, N. J., del.	26.24	....	....	....
Philadelphia, del.	25.51	25.01	....	....
St. Louis, del.	†24.12	23.24	....	....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	....	26.53	26.03
Syracuse, del.	26.08	....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.17	24.67	25.67	25.17
Muskegon, Mich., del.	27.38	....	....	27.38
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.47	24.97	25.97	25.47
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.45	25.95	26.95	26.45
Duluth, base	24.50	24.00	25.00	24.50
St. Paul, del.	26.75	26.26	27.26	26.76
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston, del.	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	....	24.50
Hamilton, O., base	24.00	23.50	....	24.00
Cincinnati, del.	24.68	24.68	....	25.35
Neville Island, Pa., base	24.00	23.50	24.50	24.00
§Pittsburgh, del. No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	21.50	....	....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	....	....
Baltimore, del.	26.05	....	....	....
Steelton, Pa., base	....	24.50	....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.89	25.39	....	26.39
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	26.06	25.56	26.56	26.06
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

High Silicon, Silvery

6.00-6.50 per cent (base)	$29.50		
6.51-7.00	$30.50	9.01- 9.50	$35.50
7.01-7.50	31.50	9.51-10.00	36.50
7.51-8.00	32.50	10.01-10.50	37.50
8.01-8.50	33.50	10.51-11.00	38.50
8.51-9.00	34.50	11.01-11.50	39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Northern

Lake Superior Furn. $28.00
Chicago, del. 31.54
(For higher silicon irons a differential over and above the price of base grades is charged as well as ...ard chilling irons, Nos. 5 and 6.)

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn. $28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. 33.00

Gray Forge

Neville Islands, Pa. $23.50
Neville Island, Pa. $23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.81, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorous content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00
Ohio	43.00

Second Quality

Pa., Ill., Md., Mo., Ky.	46.55
Alabama, Georgia	38.00
New Jersey	49.00
Ohio	36.00

Malleable Bung Brick

All bases	$59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$31.00
Wire cut	29.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.60
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$25.00-28.00
Do., barge	25.00-28.00
No. 2 lump	25.00-28.00

(Prices effective Nov. 23, 1942)

Ferroalloy Prices

Ferromanganese: 78-82%, carlots, gross ton, duty paid, Atlantic ports, ‡135; Del. Pittsburgh $140.65; f.o.b. Southern furnaces $135; Add $6 per gross ton for packed carloads $10 for ton, $13.50 for less-ton and $18 for less than 200-lb. lots, packed.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. $36.

Electrolytic manganese: 99.9% plus, less ton lots, per lb. 42.00c. Ton lots 40.00c. Annual contracts 38.00c.

Chromium Metal: Per lb. contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: 66-70%; per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c, 66-72%, low carbon grades:

	Car loads	Ton lots	Less ton	Less 200 lbs.
2% C.	19.50c	20.25c	20.75c	21.00c
1% C.	20.50c	21.25c	21.75c	22.00c
0.20% C.	21.50c	22.25c	22.75c	23.00c
0.10% C.	22.50c	23.25c	23.75c	24.00c

Spot is ¼c higher

Chromium briquets: Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Calcium Molybdate (Molyte): 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

Molybdic Oxide Briquets: 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

Molybdenum Oxide: 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

Molybdenum Powder: 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrophosphorus: 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

Ferrosilicon: Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

	Carloads	Ton lots
50%	$ 74.50	$ 87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

Spot prices ¼-cent higher.

Silicon Metal: Contract basis per lb., f.o.b. producers plants, freight allowed; 1% iron; carlots 14.50c, ton lots 15.00c, less-ton lots 15.25c, less 200 lbs. 15.50c.

Silicon Metal: Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

Silicon Briquets: Contract basis; in carloads, bulk freight allowed, per ton $74.50; packed $80.50; ton lots $84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

Silicomanganese: Contract basis freight allowed, 1½% carbon; in carloads per gross ton $135; ton lots $147.50. Spot $5 per ton higher.

Silico-manganese Briquets: Contract basis in carloads per pound, bulk freight allowed 5.80c; packed 6.05c; ton lots 6.30c; less-ton lots 6.55c; less 200-lb. lots 6.80c. Spot prices ¼-cent higher.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium; ton lots $1.23; less-ton lots $1.25. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20%, Contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Vanadium Pentoxide: Technical grade, 88-92 per cent V_2O_5; contracts, any quantity, $1.10 per pound V_2O_5 contained; spot 5 cents up.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

Zirconium alloy: 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) Contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ½-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 10.00c; ton lots 10.50c, less ton lots, 11.00c.

Borosil: 3 to 4% boron, 40 to 45% Si., $7 lb. cont Bo., f.o.b. Philo, O.

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials. As of April 16, 1941

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (13 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	AISI hot bars 2500 series	AISI hot bars 3100 series
Boston	3.98[1]	3.85[1]	3.85[1]	5.66[1]	3.71[1]	4.06[1]	5.06[1]	5.11[14]	4.66[14]	4.13[21]	3.46	7.75[20]	6.05[20]
New York	3.84[1]	3.75[1]	3.76[1]	5.56[1]	3.58[1]	3.98[1]	3.96[1]	5.00[13]	4.60[1]	4.09[21]	3.51	7.60[20]	5.90[20]
Philadelphia	3.85[1]	3.55[1]	3.55[1]	5.25[1]	3.55[1]	3.95[1]	4.45[1]	4.90[16]	4.63[15]	4.06[21]	3.31	7.56[20]	5.86[20]
Baltimore (city)	3.85[1]	3.70[1]	3.70[1]	5.25[1]	3.50[1]	4.00[1]	4.35[1]	5.05[17]	5.00[20]	4.04[21]	....	....	....
Baltimore (country)	3.85[1]	3.70[1]	3.45[1]	5.25[1]	3.25[1]	4.00[1]	4.35[1]	4.75[17]	5.00[20]	4.04[21]	....	....	....
Washington, D. C.	3.95[1]	3.80[1]	3.80[1]	5.35[1]	3.60[1]	4.10[1]	4.45[1]	5.15[17]	5.10[20]	4.03[21]	....	....	....
Norfolk, Va.	4.00[1]	4.05[1]	4.05[1]	5.45[1]	3.85[1]	4.10[1]	4.10[1]	5.40[17]	4.50[24]	4.15[21]	....	....	....
Bethlehem, Pa.*	....	3.45[1]	....	....	....	....	....	....	....	....	....	....	....
Claymont, Del.*	....	....	3.45[1]	....	....	....	....	....	....	....	....	....	....
Coatesville, Pa.*	....	....	3.45[1]	....	....	....	....	....	....	....	....	....	....
Buffalo (city)	3.35[1]	3.40[1]	3.62[1]	5.25[1]	3.25[1]	3.82[1]	3.82[1]	4.75[18]	4.30[20]	3.75[21]	3.52	7.35[20]	5.65[20]
Buffalo (country)	3.25[1]	3.30[1]	3.62[1]	5.25[1]	3.15[1]	3.82[1]	3.82[1]	4.65[18]	4.20[20]	3.65[21]	....	....	....
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[18]	4.00[24]	3.65[21]	....	7.45[20]	5.75[20]
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[18]	4.00[24]	3.65[21]	....	....	....
Cleveland (city)	3.25[1]	3.58[1]	3.40[1]	5.18[1]	3.35[1]	3.50[1]	3.50[1]	4.62[18]	4.05[20]	3.75[21]	3.20	7.55[20]	5.85[20]
Cleveland (country)	3.25[1]	3.58[1]	3.30[1]	5.18[1]	3.25[1]	3.50[1]	3.50[1]	4.62[18]	3.95[20]	3.65[21]	....	....	....
Detroit	3.49[1]	3.65[1]	3.60[1]	5.27[1]	3.43[1]	3.43[1]	3.68[1]	4.84[19]	4.30[24]	3.80[21]	3.40	7.67[20]	5.97[20]
Omaha (city)	4.10[1]	4.15[1]	4.15[1]	5.75[1]	3.85[1]	4.20[1]	4.20[1]	5.52[16]	4.77[24]	4.42[21]	....	....	....
Omaha (country)	4.00[1]	4.05[1]	4.05[1]	5.65[1]	3.75[1]	4.10[1]	4.10[1]	5.52[16]	4.77[24]	4.42[21]	....	....	....
Cincinnati	3.60[1]	3.68[1]	3.65[1]	5.28[1]	3.42[1]	3.67[1]	3.67[1]	4.92[16]	4.37[24]	4.00[21]	3.45	7.60[20]	5.99[20]
Youngstown, O.*	....	....	....	....	....	....	....	4.40[13]	....	....	....	....	....
Middletown, O.*	....	....	....	....	3.25[1]	3.50[1]	3.50[1]	4.40[13]	....	....	....	....	....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	4.85[16]	4.10[24]	3.75[21]	3.50	7.35[20]	5.65[20]
Chicago (country)	3.40[1]	3.45[1]	3.45[1]	5.05[1]	3.15[1]	3.50[1]	3.50[1]	4.75[16]	4.00[20]	3.65[21]	....	....	....
Milwaukee	3.63[1]	3.68[1]	3.68[1]	5.28[1]	3.38[1]	3.73[1]	3.73[1]	4.98[16]	4.23[24]	3.88[21]	3.54	7.33[20]	5.88[20]
St. Paul	3.75[1]	3.80[1]	3.80[1]	5.40[1]	3.50[1]	3.85[1]	3.85[1]	5.00[1]	4.35[1]	4.34[21]	3.83	7.70[20]	6.00[20]
St. Louis	3.64[1]	3.69[1]	3.69[1]	5.29[1]	3.39[1]	3.74[1]	3.74[1]	4.99[16]	4.24[24]	4.02[21]	3.61	7.72[20]	6.02[20]
Indianapolis (city)	3.60[1]	3.70[1]	3.70[1]	5.30[1]	3.45[1]	3.75[1]	3.75[1]	5.01[16]	4.25[24]	3.97[21]	....	....	....
Indianapolis (country)	3.35[1]	3.45[1]	3.40[1]	5.05[1]	3.20[1]	3.50[1]	3.50[1]	5.01[16]	4.00[24]	3.97[21]	....	....	....
Memphis, Tenn.	3.90[1]	3.95[1]	3.95[1]	5.71[1]	3.85[1]	4.10[1]	4.10[1]	5.25[11]	4.66[24]	4.31[21]	....	....	....
Birmingham (city)	3.50[1]	3.55[1]	3.55[1]	5.83[1]	3.45[1]	3.70[1]	3.70[1]	4.75[16]	4.78[24]	4.43[21]	....	....	....
Birmingham (country)	3.40[1]	3.45[1]	3.45[1]	5.83[1]	3.35[1]	3.60[1]	3.60[1]	4.75[16]	4.78[24]	4.43[21]	....	....	....
New Orleans (city)	4.10[1]	3.90[1]	3.90[1]	5.85[1]	3.95[1]	4.20[1]	4.20[1]	5.25[16]	4.95[16]	4.60[21]	5.00	....	....
New Orleans (country)	4.00[1]	3.80[1]	3.80[1]	5.75[1]	3.85[1]	4.10[1]	4.10[1]	5.15[16]	4.95[16]	4.60[21]	....	....	....
Houston, Tex.	3.75[1]	4.25[1]	4.25[1]	5.50[1]	3.75[1]	4.30[1]	4.30[1]	5.25[16]	5.43[16]	4.50[21]	....	....	....
Los Angeles	4.35[1]	4.60[1]	4.90[1]	7.15[1]	4.95[1]	4.90[1]	6.70[1]	5.95[16]	7.15[1]	5.70[21]	....	9.55[20]	8.55[20]
San Francisco (city)	3.95[1]	4.35[1]	4.65[1]	6.35[1]	4.55[1]	4.50[1]	4.50[1]	6.60[16]	7.55[16]	5.55[21]	....	9.80[20]	8.80[20]
San Francisco (country)	3.85[1]	4.25[1]	4.55[1]	6.25[1]	4.45[1]	4.40[1]	4.40[1]	6.50[16]	7.45[16]	5.45[21]	....	....	....
Tacoma	4.20[1]	4.45[1]	4.75[1]	6.50[1]	4.65[1]	4.25[1]	5.45[1]	5.70[1]	6.63[24]	5.75[21]	....	....	....
Seattle (city)	4.20[1]	4.45[1]	4.75[1]	6.50[1]	4.65[1]	4.35[1]	5.45[1]	5.70[1]	6.63[24]	5.75[21]	....	....	8.00[1]

*Basing point cities against which warehouses equalized freight as of April 16, 1941, and which must now be used in calculating lowest combination prices.

NOTE—All prices except cold-rolled strip and AISI hot-rolled bars fixed by Office of Price Administration in amendment No. 10 to Revised Price Schedule No. 49.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 3999 pounds; [6]—300 to 1999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, any quantity is base.

Ores

Lake Superior Iron Ore
Gross ton, 51½%
Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore
Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	13.00

Foreign Ore
Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00c

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore
(Equivalent OPA schedules):
Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.
(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	41.00
48% 3:1	43.50
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80
Brazilian—nominal	
44% 2.5:1 lump	33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50
Domestic (f.o.b. Columbus, Mont.)	
48% 3:1	43.50
less $7 freight allowance	

Manganese Ore
Including war risk but not duty, cents per gross-ton unit, dry, f.o.b. cars, New Orleans and Mobile; 5 cents higher at Norfolk, Baltimore, Philadelphia, New York; adjustments for analysis variations. (Based on OPA schedules.)

Brazilian, 48%	73.8c
Brazilian, 46%	71.8c
Caucasian, 51%	75.3c
Caucasian, 50%	74.8c
Chilean, 48%	73.8c
Indian, 50%	74.8c
Indian, 48%	73.8c
South African, 48%	73.8c
South African, 46%	71.8c
(Duty Free)	
Cuban, 51%	86.5c
Cuban, 48%	85.0c
Cuban, 45%	82.0c
Philippine, 50%	85.0c
Domestic, 48%, f.o.b. mines	96.0c

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Bars per 100 lb.	Basic open-hearth Billets per G T	Electric furnace Bars per 100 lb.	Electric furnace Billets per G T
	Chemical Composition Limits, Per Cent									
NE 1330	.28-.33	1.60-1.90	.20-.35	.....	.....	.....	$ .10	$2.00	....	....
NE 8020	.18-.23	1.00-1.30	.20-.35	.....	.....	.10-.20	.45	9.00	$.95	$19.00
NE 8442	.40-.45	1.30-1.60	.20-.35	.....	.....	.30-.40	.90	18.00	1.40	28.00
NE 8613	.12-.17	.70- .90	.20-.35	.40-.60	.40-.70	.15-.25	.75	15.00	1.25	25.00
NE 8720	.18-.18	.70- .90	.20-.35	.40-.60	.40-.70	.20-.30	.80	16.00	1.30	26.00
NE 9255	.50-.60	.75-1.00	1.80-2.20	.....	.....	.40	8.00	....	....	....
NE 9262	.55-.65	.75-1.00	1.80-2.20	.20-.40	.....	.65	13.00	....	....	....
NE 9415	.15-.18	.80-1.10	.40-.60	.20-.40	.20-.50	.08-.15	.80	16.00	1.30	26.00
NE 9442	.40-.45	1.00-1.30	.40-.60	.20-.40	.20-.50	.08-.15	.85	17.00	1.35	27.00
NE 9537	.35-.40	1.20-1.50	.40-.60	.40-.60	.40-.70	.15-.25	1.20	24.00	1.70	34.00
NE 9630	.28-.33	1.20-1.50	.40-.60	.40-.60	.....	.....	.80	16.00	1.30	26.00
NE 9642	.40-.45	1.30-1.60	.40-.60	.40-.60	.....	.....	.85	17.00	1.35	27.00

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

					ELECTRIC FURNACE, ACID OPEN-HEARTH AND FOUNDRY GRADES									
					Low Phos. Grades									
	OPEN HEARTH GRADES*	Mixed Bor., Turn., Machine Turnings	Cast Iron Borings	Shoveling Turnings	Billet, Bloom Forge Crops	Bar Crops and smaller; Punchings, Plate	Heavy Structural, Plate 3 ft. and less	2 ft. and less	1 ft. and less	Foundry Steel 2 ft. and less	1 ft. and less	Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$15.00	$16.00	$17.00	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$18.00	$19.50	$21.00
Claymont Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Bethlehem	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Buffalo	19.25	14.25	15.25	16.25	24.25	21.75	20.75	21.25	21.75	20.75	21.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	14.50	15.50	16.50	24.50	22.00	21.00	21.50	22.00	21.00	21.50	17.50	19.00	20.50
Detroit	17.85	12.85	13.85	14.85	22.85	20.35	19.35	19.85	20.35	19.35	19.85	15.85	17.35	18.85
Toledo	†18.35	12.85	13.85	14.85										
Chicago	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Kokomo	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Duluth	18.00	13.00	14.00	15.00	23.00	20.50	19.50	20.00	20.50	19.50	20.00	16.00	17.50	19.00
St. Louis	17.50	12.50	13.50	14.50	22.50	20.00	19.00	19.50	20.00	19.00	19.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	12.00	13.00	14.00	22.00	19.50	18.50	19.00	19.50	18.50	19.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	12.50	13.50	21.50	19.00	18.00	18.50	19.00	18.00	18.50	14.50	16.00	17.50
Seattle	14.50	9.50	10.50	11.50	19.50	17.00	16.00	16.50	17.00	16.00	16.50	12.50	14.00	15.50

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails 3 ft. and under	Scrap Rails 2 ft. and under	Scrap Rails 18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	$21.00	$22.00	$23.50	$24.00	$24.25	$24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	15.50	16.50	17.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

***Open Hearth Grades** refer to No. 1 heavy melting steel. No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. No. 1 chem. borings, 1 per cent oil, $1 under, No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, No. 2 busheling, $2.50 under No. 1 heavy melting steel, auto springs, crankshafts, $1 over No. 1 heavy melting. †Toledo open-hearth grades cover only No. 2 busheling.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead Duquesne, Munhall and McKeesport Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, if most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $3.50 less; (material from which Nos. 1, 2 and 3 bundles made is $4 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grades of prepared scrap."

Remote Scrap: Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, Utah. Delivered price may exceed by not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½, refinery; dealers may add ¾c for 5000 lbs. to carload: 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 12.25c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 14.25c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 30,600 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, corroding or chemical, 6.40c, E. St. Louis for carlots; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York State, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester-Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less than 2000 lbs.

Secondary Aluminum: All grades 15.00c per lb. except as follows: Low-grade piston alloy (No. 122 type) 14.50c; No. 12 foundry alloy (No. 2 grade) 14.50c; chemical warfare service ingot (99½% plus) 14.50c; steel deoxidizers in notchbars, granulated or shot, including ingot containing over 2% iron, Grade 1 (95-97½%) 14.75c, Grade 2 (92-95%) 14.50c, Grade 3 (90-92%) 14.00c, Grade 4 (85-90%) 13.50c, Grade 5 (less than 85%) 12.50c. Above prices for 30,000 lbs. or more; add ¼c 10,000-30,000 lbs.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 20.50c lb.; add 1c for special shapes and sizes, including 3-lb. ingot and 12-lb. round ingot; incendiary bomb alloy 23.40c, 50-50 magnesium-aluminum 23.75c, ASTM B80-41T No. 11 25.00c, ASTM B94-40T No. 13 25.00c, all others 23.00c. Prices for 100 lbs. or more; for 25-100 lbs. add 10c; for less than 25 lbs. 20c; incendiary bomb alloy f.o.b. plant any quantity; carload freight rate allowed all others for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.75-99.79% incl, 51.62½c; Grade C, Cornish refined 51.62½c; Grade D, 99.0-99.74% incl. 51.12½c, Grade E, below 99%, 51.00c.

Antimony: American, bulk, carlots, f.o.b. Laredo, Tex., 99.0-99.8% grade 14.50c, 99.8% and over (arsenic 0.05% max.; no other impurity to exceed 0.1% 15.00c. Add ¼c for less-carlots to 10,000 lbs.; ½c for 9999-224 lbs.; 2c for 223 lbs. and less.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: Prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz. $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $15 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $2.11 lb.; 100 lbs. or more on contract, $1.50 lb.

Indium: 99.5%, $10 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y., 44.75c per ounce.

Platinum: $36 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A, B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.40c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 28.75c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c, Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Bare, soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlots 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s, flat, mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameters 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.50c Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu; 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 13.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled, carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400-lb. bbls. 39.00c f.o.b. Graselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c, f.o.b. Niagara Falls.

Scrap Metals

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ¾c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze 90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz metal	8.000	7.750	7.250
Nickel Sil., 5%	9.250	9.000	4.625
Phos. br., A. B. 5%	11.00	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	3.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbitt-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 8.00c; Muntz metal condenser tubes 7.50c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Prices f.o.b. point of shipment, respectively for lots of less than 1000 lbs.; 1000-20,000 lbs. and 20,000 lbs. or more; plant scrap only. Segregated 2s solids 10.00c, 11.00c, 11.50c; all other solids 9.50c, 10.50c, 11.00c; borings and turnings 7.50c, 8.50c, 9.00c; mixed solids 8.50c, 9.50c, 10.00c, mixed borings and turnings 6.50c, 7.50c, 8.00c.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings, old zinc 7.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c; add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clippings 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 160

Demand for chrome-molybdenum sheets by the aircraft industry is heavy and a mild spurt in stainless for food dehydrating and handling units, which is beginning to recede, features activity in alloys; buying in small lots is more frequent. In general, however, sheet orders are sensitive to the flow of war contracts, special engineering fabrication, notably cold-finished; in many details effect of war volume is stressed in sheet consumption. Some fabricators, ordinarily leading consumers, are buying little, while new users are appearing. Heavier gages of hot and cold-finished carbon sheets are more in demand than lighter stock. Tonnage going to warehouses is slightly heavier and shipyards tend to take larger volume.

Producers are booked up to second quarter quotas on some finishes of narrow cold strip, with limited openings for June schedules in others. Bookings are off slightly, a natural result of earlier PRP orders which are being processed to CMP, the latter now covering an increasing ratio of new purchases. Production is up to directives in most cases with mills striving to maintain a balance in acceptance to avoid overloads on some lines, notably high carbon stock requiring long annealing. Although demand is less even and subject to changes in connection with ordnance demands, small arms ammunition and gun links are leading tonnage consumers.

Alloy capacity for second quarter is well filled and tentative commitments are in for August and September; the alloy melt is held to 105 days ahead of rerolling and shipments.

At least one large sheet producer in the East is turning away new orders on hot and cold-rolled sheets for delivery this quarter and another mill has little left of either of these grades. The latter can offer a moderate tonnage of galvanized and sheet specialties.

Bars . . .

Bar Prices, Page 160

Most sellers of hot-rolled carbon steel bars now have little to offer before June and considering such allocations as must be anticipated for that month they have not much to offer against general demand in second quarter. In large rounds and flats most producers have nothing to offer.

Cold drawers are in a generally tighter position and while they may be able to process a little of their June hot bar tonnage before the end of that month it will be a negligible quantity at best. Cold drawers will submit specifications for hot-rolled bar supply for June about April 25. Deliveries on cold-drawn alloy bars are said to be out of the question before August.

Volume already booked and being certified to CMP allotments leaves little room for new commitments. Prospects for slightly more tonnage to warehouses under load directives, allocations to cold finishers and maintained duration war contracts, against which specifications are heavy, account for production during remainder of the quarter and beyond. While jobbers are apparently to receive slightly more tonnage, prospects in other directions as to new orders are hardly improved. Only in hot-rolled carbon material are deliveries freer in spots.

In New England old contracts requiring forging stock are maintained, supplemented by several substantial new orders for small tools, notably wrenches. A contract for wrenches went to Rhode Island Tool Co., Providence, in excess of $155,000, one of several distributed. Marine hardware and forged link chain bar requirements are also large.

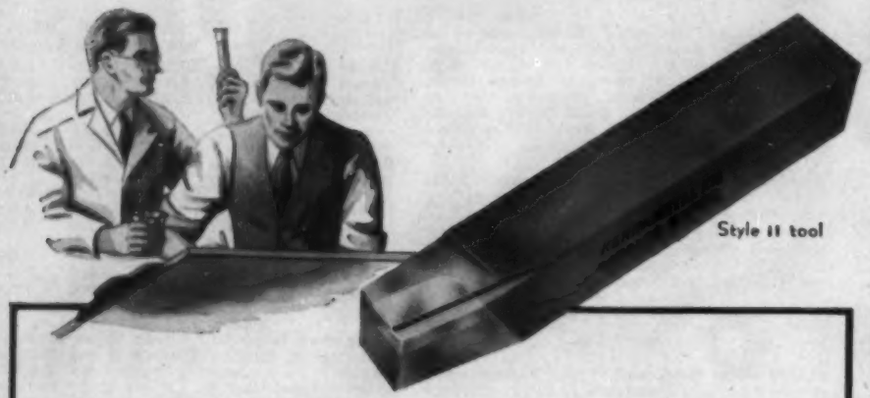
In the New York metropolitan area the aircraft industry continues to consume the heaviest quantity of cold-drawn bars, with ammunition next, ships third and machine tools fourth. While there is still an active demand from machine tool builders, inquiry has sagged noticeably since the first of the year.

Plates . . .

Plate Prices, Page 161

While some tank fabricators, especially those located inland, report a falling off in special government work outside their normal field, eastern tank makers and fabricators declare their government business so far has been well sustained. Certain fabricators admit that they have received no new work recently, but point out that their backlogs are still fairly substantial. Next to shipyards, fabricators are the largest buyers of plates in the East.

That government work for these fabricators is holding up as well as it is may be attributed in part to their close proximity to shipyards. This places them



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in position to get much of the overflow of fabricated work.

However, tank makers and structural fabricators in various sections are still having difficulty keeping their forces active. There is little straight storage tank work currently. Work for military bases, government cantonments and the like is largely completed. Some fabricated work is being shipped overseas for special military projects, but even this is far from large, and in general ordinary water and gasoline tank bookings are negligible. Tank work for high-test gasoline and synthetic rubber programs also is ebbing rapidly, although here there may be a spurt within the next couple of months when new projects get beyond the paper stage.

Special government jobs, such as wind tunnels, dry docks and ship sub-assemblies have reached the point where some inland shops will have to close down some departments, unless new contracts soon develop. Tank makers have approached Washington for an easing in limitations on civilian tanks. They point out that a number of municipalities urgently need new tank equipment. However, these fabricators have not received encouragement, even though the feeling in trade circles is that plate supply is definitely easier.

Allocations for May in New England are heavier, due to increased schedules for at least two shipyards and substantial subcontracting of assemblies, as well as requirements for escort and special craft. The volume of plates partially fabricated and in shops for fitting, which does not appear in inventories each month, is heavy.

Transition of plates entirely to CMP may be somewhat slower than some other products and will not be complete, according to current outlook, until June rollings, at least. Under allocations many wrinkles have been ironed out of distribution in recent months with progressive efficiency and better control of inventories.

Some eastern plate sellers assert about 80 per cent of recent buyer applications for May rolling carried CMP allotment numbers and the percentage for June is expected to be still higher, with the result there should be little difficulty in making the final conversion step to CMP for July.

Pipe . . .

Pipe Prices, Page 161

Deliveries on lap weld pipe now average 10 to 12 weeks and butt weld six to eight weeks. Extended shipments on lap weld pipe are ascribed in part to substantial tonnages going abroad. Merchant pipe in general is less active than normal at this season, due to restrictions on building construction. Mechanical and boiler tubing, however, are in heavy demand with deliveries running many weeks ahead.

In attempts to ease pressure for seamless tubing, use of welded material is encouraged where possible; in the case of chromium-molybdenum, warehouses are to accept 20 per cent of the total in welded tubing. Substantial part of the latter is distributed through earmarked stocks to the aircraft industry, with demand heavy. Extended deliveries on boiler tubes are largely due to heavy backlogs carried by mills for seamless tubing; inquiries frequently bring only one or no quotations for tubes. Distributor inventories of steel pipe are coming into better balance, both butt and lap welded. Slack building has hit pipe buying, but in the aggregate a fair miscellaneous demand prevails. For ships inquiry is heavy, largely for tubing.

Steel pipe contracts for navy ships include awards to Noland Co., Washington, $242,586.65, and Wheatland Tube Co., Wheatland, Pa., $100,587.73. For Panama, quotations are in on 79,200 feet of carbon steel pipe, and 32,400 feet of welded, small diameters; shipment is promised in 30 days by several mills and on a few items even earlier.

Wire . . .

Wire Prices, Page 161

Volume of wire specialties, high ratio of which requires much processing, promised and validated for delivery as early as possible this quarter, precludes scheduling considerable CMP orders before late May or June. Production will gradually come under the new plan with completion of deliveries against promised tonnage and by the end of the quarter is likely to be centered nearly 100 per cent around CMP.

In the aggregate, new orders are somewhat more spotty, with shipments heavy. Large demand holds for valve spring wire with producers having difficulty in maintaining uniform heats to meet

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chromium-vanadium specifications. Considerable music wire is required for springs and in numerous instances open-hearth steel is replacing electric furnace material for more specialties, razor-blade steel in one case. Round wire departments are mostly engaged at capacity, with flat wire lagging; annealing is still the choke-point on many products.

Cross-hauling is being reduced where possible in supplying rope mills with wire for stranding, the latter coming from mills in the same district, or as nearby as possible. This has upset trade relationships of long standing in some instances.

Rope mills are booked solid for three months and beyond in some cases, but large new contracts supplement already heavy backlogs. Ships and heavy materials handling equipment account for much tonnage. Bulk of a navy contract went to Wire Rope Corp. of America, New Haven, Conn., $1,078,386.20. Small fastenings, notably screws, also require large tonnages for war needs. For wood screws, navy, National Lock Co., Rockford, Ill., has a contract at $336,994.14. Welding wire, however, has been given the greatest lift by war influence and production currently is on a basis of better than 500,000 tons annually, mostly coated. Straight chromium and nickel-chromium rods are being processed at four times above the 1941 rate.

Rails, Cars . . .

Track Material Prices, Page 161

Late advices indicate that Washington will approve construction of 44,000 domestic freight cars in last half in addition to whatever carryover there may be from the 20,000 scheduled for first half. Should this program go through 64,000 cars will be built for American roads in 1943.

Some cars for second half are already on schedule as only a portion of the 7765 placed early in the year, mainly in January, were included in the 20.000 approved for first half. Meanwhile Chesapeake & Ohio is said to be planning a request for 2380 additional hoppers and Norfolk & Western 1000 composite hoppers, with bids on the latter to be opened soon.

Due to government restrictions, orders placed during first quarter involved 7765 cars, compared with 20,058 in the same period in 1942 Comparisons are shown in the table below:

	1943	1942	1941	1940
Jan.	7,415	4,253	15,169	360
Feb.	350	11,725	5,508	1,147
March	0	4,080	8,074	3,104
3 mos.	7,765	20,058	28,751	4,611
April		2,125	14,645	2,077
May		822	18,630	2,010
June		0	32,749	7,475
July		1,025	6,459	5,846
Aug.		0	2,668	7,525
Sept.		1,863	4,470	9,735
Oct.		0	2,499	12,195
Nov.		0	2,222	8,234
Dec.		135	8,406	7,181
Total		26,028	121,499	66,889

It is reliably reported that Washington has approved construction of 65 trolley cars for Boston and 35 for Baltimore. Orders for a somewhat larger number were placed several months ago, subject to government approval. Authority has also been given one builder for 25 trolley coaches for several destinations.

It is understood Washington has approved for construction this year 3000 transit buses, 7500 bus bodies, 270 street cars and 75 trolley coaches. This is a somewhat more liberal program than was set up at the beginning of the year. While the Army plans purchase of 1200 hospital and supply coaches specifications have not been completed.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 161

Demand for concrete bars is the best in a number of weeks, the result of several building construction and highway jobs reaching the bidding stage more or less simultaneously. Two war plant expansions in the Chicago district, totaling 800 tons, already have been awarded and general contracts on two bridge projects have been placed, indicating that steel requirements will be booked shortly.

Structural Shapes . . .

Structural Shape Prices, Page 161

With building backlogs gone or rapidly disappearing, structural fabricating shops are closer affiliated with the shipbuilding and miscellaneous war program. Many foresaw the need of radical changes weeks ago and by acting promptly and aggressively are managing to maintain fair schedules; others, late in recognizing the trend, are still seeking contracts. Shop operations have undergone much revision with welding ca-

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pacity engaged heaviest. Ships are taking most structural mill output, with deliveries well geared to needs. Most warehouses were able to build up balanced and comfortable inventories on structurals for the April 1 deadline and with replacements to be based on sales, material which may be bought from the WPB Steel Recovery Section excepted, current intake by jobbers is slack.

Pig Iron . . .

Pig Iron Prices, Page 162

Notwithstanding reports of a lighter melt, some pig iron sellers declare that applications for May pig iron are fairly well sustained in volume. In fact, one eastern seller reports applications involving a heavier tonnage than for April.

Sellers point out that while the melt has been off at some foundries recently, such declines are often temporary and that while they are not in a position to analyze May applications fully it could easily be that some foundries have received additional orders or that their customers no longer need to hold up shipments, as has been the case with machine tool builders. Not infrequently foundries have delivered machinery castings faster than they could be absorbed and consequently temporary suspensions have been requested by machinery builders.

Several hundred tons of malleable are reported placed for export, the first foreign allocation noted in some time.

Bolts, Nuts, Rivets . . .

Bolt, Nut, Rivet Prices, Page 161

Eastern bolt and nut producers appear to be averaging around 50 to 55 hours per week and could operate at a much higher rate if sufficient manpower and steel were available. Demand, they say, is heavy, with especially large tonnages being figured for export. Deliveries in some lines run 12 to 14 weeks with larger makers, although some smaller manufacturers can do better.

Scrap . . .

Scrap Prices, Page 164

While scrap is being received in sufficient supply to keep steel production at top rate, signs indicate there may be a tight situation by the middle of the year and warnings have been given by dealers that they may not be able to meet demands later. Collections of last summer have been gradually worked over and shipped and repetition of the outpouring during the nationwide campaign scarcely can be expected this year. Industrial scrap is coming out in heavy volume as steel conversion increases and supplies of home scrap is larger, in proportion to increased steel output. Turnings continue to be a drug on the market.

Current scrap shipments to the St. Louis district are fairly large but quality is said to be poor, containing much light material and turnings. No. 2 heavy melting steel is difficult to obtain and other steel grades fail to meet demand. Railroad offerings are reduced from the rate of last month.

Buffalo dealers find a sharp shrinkage in scrap movement in recent weeks but mill backlogs continue at a gratifying level. One reason for this is reported larger use of direct iron in open hearths. Some yards are almost at a standstill because of labor shortage.

Dealers and brokers in the Cincinnati area have given warning that yards do not hold large reserves of unprepared scrap and that a pinch in supplies might be expected by midsummer as sources tapped by strenuous efforts last year probably would not yield as well now. One steelmaker has halted deliveries of all grades except No. 1 steel and No. 1 bundles, thus diverting other grades elsewhere. Foundries in that district are buying some material but are usually well supplied.

Chicago melters find current shipments about equal to consumption after several weeks of dipping into reserves and further improvement in receipts would enable stocks to be replenished. Railroad scrap offerings are heavier. Recent increase in wages for yard workers has not resulted in attracting sufficient labor to handle incoming tonnage and the scrap situation hinges mainly on the factor of yard preparation. The same situation applies to collection of rural scrap, fewer persons being engaged in this activity than in normal times.

Fairly deluged with turnings, consumers in eastern Pennsylvania in several instances have requested temporary suspensions. Heavy melting steel grades are coming out more freely, mainly a result of cessation of allocations from northern New Jersey and New England to Pittsburgh and Youngstown districts.

Although consumption of steel and

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iron scrap in February, at 4,361,000 gross tons, was less than the 4,753,000 tons melted in January, as estimated by the Institute of Scrap Iron and Steel Inc., on a daily average basis it showed an increase. The February consumption was largest in history for that month and compares with 4,276,000 tons in February, 1942.

Warehouse . . .

Warehouse Prices, Page 163

To meet heavier and broadening demand, steel warehouses in most areas have better inventories on most products, although frequently out of balance as to sizes. Replacements generally have been better, although scattered exceptions are apparent. This is expected to continue through second quarter under special directive. On some lines jobbers improved inventories by April 1, and, with future replacements based on sales, fair reserves are likely. April sales will be replaced in August, stocks to be filled in the interim by directive warehouse load.

Improved receipts include several items which have been the tightest, seamless tubing and larger cold-finished and alloy rounds and flats. There are exceptions but in general this holds true. Several distributors are well balanced to meet demand for high-speed and tool steel. While there are wrinkles to be ironed out, most jobbers are of the opinion the new setup as to replacements will eventually be an improvement.

A meeting of members of the warehouse trade to explain specific maximum prices in the four zones will be held by Office of Price Administration in Philadelphia Tuesday, April 13, at the Chamber of Commerce, Twelfth and Walnut streets. Everett L. Wyman, head of the Warehouse and Jobbers' Section of the Iron and Steel Price Branch, OPA, will preside.

Iron Ore . . .

Iron Ore Prices, Page 163

Following efforts of icebreakers it has been hoped first upbound ore carriers might pass the Soo about April 15, though heavy ice in Whitefish Bay might delay them in reaching the open lake. This would compare with March 23 last year.

First cargoes of ore left Escanaba, Mich., April 5, two ships of Inland Steel Co. clearing for Indiana Harbor, Ind., with ore from the Menominee and Marquette ranges. Two Inland ships left Chicago March 30 for Port Inland, Mich., to load limestone.

Manganese Ore . . .

Manganese Ore Prices, Page 163

Manganese ore consumers are in increasingly comfortable position with respect to supply. In some trade quarters it is estimated that the country has a reserve of at least 2,000,000 tons. Some estimate that it is not far from 2,400,000 tons, or virtually two years' supply. This backlog is believed to include 150,000 to 200,000 tons of ore in stock in Cuba. There is also a fairly substantial reserve above ground for American account in Brazil. However, this is not included in the above estimates.

Reserves have been augmented by a freer movement from abroad so far this year, compared with final quarter of last year. Some trade estimates range around 130,000 tons in the aggregate for the first two months. This, however, is not large compared with the movement earlier in the emergency.

Relatively, shipments from the Gold Coast, West Africa, have been heavier recently than from other foreign sources. This is attributed in part to the greater number of ships which are available as a result of heavy movement of munitions to North Africa.

Meanwhile domestic production is expected to be stepped up shortly by output at the Hanna property in Nevada.

While a portion of the shipments are for the account of individual buyers, much of it is for the Metals Reserve Corp., which, in turn, supplies a number of consumers. It is pointed out that all of the ore coming into this country, whether for the direct account of consumers or for Metals Reserve or for the Bureau of Economic Warfare, is under government control, inasmuch as shipping space has to be approved by the government.

Metallurgical Coke . . .

Coke Prices, Page 161

Despite increasing demand for beehive coke only a minor increase has been made in the number of beehive ovens actually in operation, during the first quarter amounting to about 3 per

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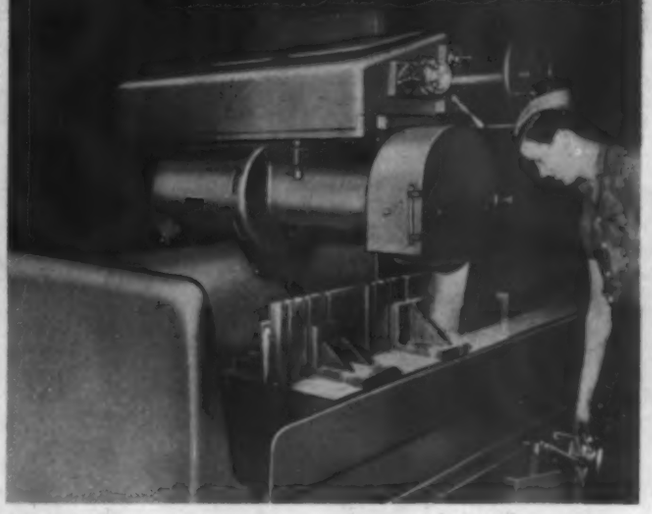

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cent of the total. There was a slightly larger increase, about 6 per cent, in the total number of ovens available, which is an indication that maintenance problems are playing an increasing part in tonnage of coke produced in the beehive field.

No further developments have been reported in the coke price situation and virtually all operators are apparently maintaining an economic balance at ceiling prices.

Pacific Coast . . .

Seattle — The recently organized Pacific American Steel & Iron Corp., with offices in Seattle and Vancouver, B. C., is planning to make application to the RFC for a loan of $25,000,000 to finance construction of plants on the North Pacific Coast. Former Congressman Knute Hill, of Washington, has become associated with the company as the Seattle manager.

Announcement is made that Kaiser's Swan Island shipyards will construct 47 additional 16,500-ton tankers. The original contract was for 56 vessels. It is stated that the entire 103 units will be operating by the end of 1944. The first aircraft escort vessel of a number awarded to Kaiser's Vancouver yard was launched April 5.

J. A. Terteling & Sons, Boise, Idaho, have a major contract to relocate three miles of main track for the Northern Pacific railroad near Cle Elum, Wash., and a 1½-mile stretch near Bristol, Wash.

Western Gear Works, Seattle, has a $435,000 RFC allocation for construction of increased facilities in Washington state The same government agency has authorized a $200,000 contract with the Pacific Chain & Mfg. Co., Portland, Oreg., for increased plant facilities, and $42,000 to the Shofner Iron & Steel Works, for expansion.

Reports from Edmonton, Canada, state that American Bridge Co. and Peterson Bros. have been awarded a major contract for construction of steel bridges over the Liard, Muskwa and Sikanni rivers, Canadian-Alaskan highway project.

U. S. Pipe & Foundry Co., through H. G. Purcell, Seattle, will furnish 100 tons 12-inch cast iron water pipe for the Eighth avenue South improvement in Seattle. Orton, Wash., has received bids for 19,500 feet of 6 and 8-inch cast iron water pipe, Parker & Hill, Seattle, engineers. Glenwood water district, Eugene, Oreg., has called bids April 15 for a $47,000 water system project. Bids are called at Salem, Oreg., April 19, for 3400 feet of 8 and 12-inch pipe for Oregon State College; concrete mains probably will be purchased. Vancouver, Wash., housing authority has awarded a $811,274 contract to A. J. Goerig Construction Co., Seattle, for installation of water and sewer system, including 8 million gallon reservoir, sewage pumps and other facilities.

Rolling mills report they have a sustained demand for merchant bars but practically no reinforcing bars are being rolled at present. Merchant backlogs are large.

Canada . . .

Toronto, Ont. — Under maximum war production, steel requirements in Canada have moved ahead at a much more rapid rate than has production, and as a consequence this country continues to draw heavily upon the United States to augment its steel supply. In addition to heavy demand for steel and other metals on direct war account, it is now indicated that large tonnages of steel will be made available for other essential industries, closely allied with the war program. In this connection it is stated that the Canadian Pacific Railway Co. is considering placing new rolling stock orders to include both cars and locomotives, and that National Steel Car Corp., Hamilton, and Canadian Car & Foundry Co., Montreal, will obtain a large share of the business. Rolling stock deliveries by Canadian producers last year showed some improvement over the previous year, but old contracts have not yet been all cleaned up. Steel allocations to rolling stock builders will be increased at an early date, it is stated.

Little change was reported in plate and sheet sales for the week. Fresh buying continued in heavy volume, with most new business from the shipbuilding industry. Specifications are being prepared and orders are expected soon in connection with construction of new types of fighting ships. However, most current plate deliveries are going to builders of cargo ships.

Demand for merchant bars, especially carbon and alloy bars, is well sustained. Mill representatives report a continuous flow of new orders from diversified groups of buyers. Agricultural imple-

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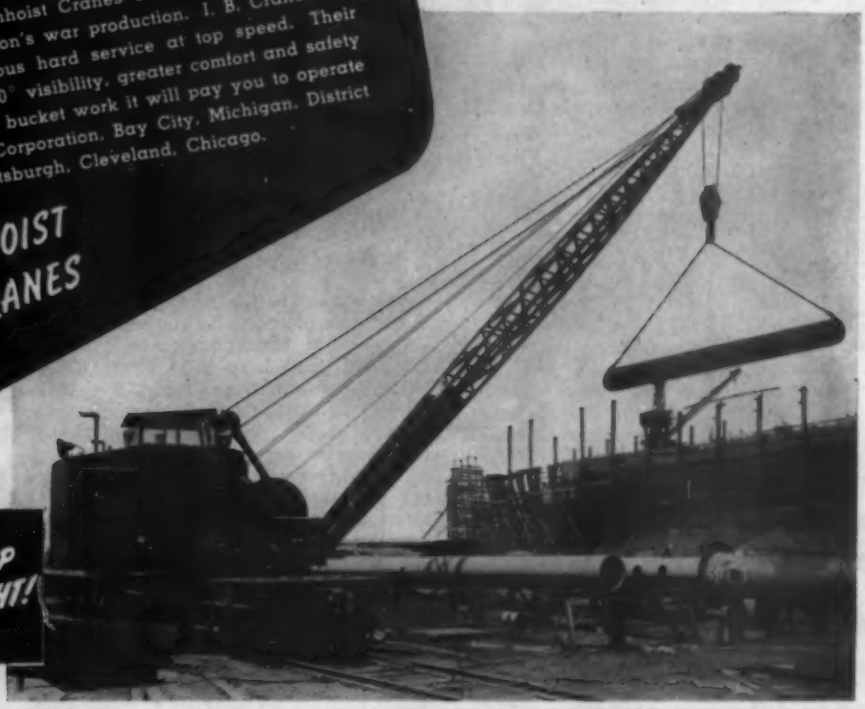

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ment makers have been ordering in larger tonnages recently and their allocations have been increased. While demand on direct war account is increasing, domestic output is keeping pace and while no large inventories are reported, there is no shortage. Deliveries against new orders are from six to eight weeks into the future, although nothing definite is promised in this respect.

Merchant pig iron deliveries have been in better volume during the past week or ten days, with indications that the steel controller is making larger tonnages of merchant iron available to foundries engaged in war work. Demand also is gaining in volume, averaging about 11,000 tons per week for foundry and malleable grades. Basic iron sales, however, are slow. Agricultural implement makers have been taking more iron recently.

Supply of scrap for steelmaking appears to be causing some uneasiness. While there has been no slowing down in steel production through scrap shortage, some mills are nearing the end of their stock piles and fresh deliveries, while improving, are barely sufficient for 40 per cent of requirements. In steelmaking operations alone, Canadian mills are consuming approximately 85,000 tons of scrap a month which has to be provided from outside sources, in addition to a similar tonnage of their own make.

Steel in Europe . . .

London—(*By Radio*)—Steelworks in Great Britain are well booked to the end of June. Demand is increasing for special alloy steels. Engineering foundries are fully occupied with war work and demand and production in light castings is improving.

Nonferrous Metals . . .

Nonferrous Prices, Page 165

New York — Fabricators consumption of copper first quarter was at the rate of close to 1,600,000 tons annually. War requirements continue tremendous, overshadowing civilian use which is declining; additional restrictions on copper in fans, air-conditioning, refrigeration equipment and copper chemicals in plating are effective. May allocations will be certified late this week. With domestic copper covered first for distribution each month, the balance is filled with MRC material. To meet required shapes for specific needs, matching allocations with the latter are more difficult than with domestic supply.

While MRC releases are heavier in spots, stocks are replaced promptly and the reserve inventory of copper is rigidly maintained. Allocations to at least one ordnance plant have been resumed following operations on scrap for some weeks. Smoother operation of monthly distribution is apparent with additional improvement expected for May. No. 1 and 2 copper scrap is tight and refiners get little red brass scrap; most of the latter is going into navy specification ingots.

Refining operations on general copper-bearing scrap range from 85 to 90 per cent of capacity, but where the 625,000 tons of refinery brass and copper-bearing material in excess of the 1,000,000 tons taken last year is problematical. Production of industrial scrap is maintained, but supplies in other directions have dwindled. To bring products of brass and bronze alloy ingot makers under one regulation brass and bronze alloy shot has been added to the maximum ceiling order. The emergency pool in zinc for May has been moved up to 75 per cent of January production for high grade and 50 per cent in other grades. While zinc allocations for two months have been nearly uniform as to total tonnage, some scattered increases are expected next month, certificates to be in around April 25.

Supplementing domestic deliveries of lead this month, MRC released some tonnage on foreign, indicating some consumers underestimated and the likelihood of some increase in consumption. About 2500 tons of tin per month, grade A, equal to Straits, is now being produced by the Texas smelter. Tin plate production will be heavier this quarter, but lighter coatings with the electrolytic process will not lift tin consumption for tin mill products.

Equipment . . .

Boston — Contract for two 10-ton bridge cranes for the navy yard at South Boston, went to Shaw-Box Crane & Hoist division, Manning, Maxwell & Moore, Muskegon, Mich., at $27,008. While there has been a decline in contracts for electric overhead bridge and other types of cranes in recent weeks, backlog of the industry covers seven to eight months. At one time last year the backlog extended more than a year with some builders. Crane handling capacity has been more than tripled in the last two years. Current contracts in the backlog are highly rated for steel and materials; roller bearings have been among the most difficult to obtain.

New York—While delivery on a considerable number of machine tools is affected by revised urgency lists, pressure is easing on some units and in more directions. Included in the urgency list are many tools destined for aircraft and allied industries but the range is being broadened to other war contractors.

By July or August, at the current rate, immediate delivery will be possible on some tools and some manufacturers are beginning to place service men and salesmen back in the field. Already several hundred machines purchased in pool buying during second half last year are available for immediate shipment. Most of these were bought for special production contracts and built by border-line shops, some of which apparently booked heavily. Changes in production programs make a substantial number of these metalworking and cutting tools available.

Orders are now largely for one to three machines at a time with few orders containing varied lists for complete new plant tooling. There is also a slight easing in demand for automatic screw machines, thousands having gone into production during the last 18 months. The tightest situation now prevails in cutting tools and attachments, although on many units the latter have been stripped to absolute needs and streamlined in the interest of conservation. There is also some slowing down in subcontracting among machine tool builders. Measuring tools are notably tight.

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NEW BUSINESS

Plant Expansion, Construction and Enterprise, Government Inquiries, Sub-Contract Opportunities, Contracts Placed and Pending

SUB-CONTRACT OPPORTUNITIES

Data on subcontract work are issued by regional offices of the War Production Board. Contact either the office issuing the data or your nearest field office. Write, don't telephone, and mention key letters and numbers appearing before each item to assure prompt attention and avoid delay.

Boston office, Contract Distribution Branch of WPB, 17 Court street, is seeking contractors for the following:

SC-86: Jig-boring work for machines having micrometer adjustment. Also facilities for complete jig manufacturing. Various items required. Reference, 1-A-774.

SC-87: General machine shop facilities, including planers, boring mills, cylindrical grinders, for handling overhauling and rebuilding of machines to blueprints. Continuous work. Skilled mechanics necessary. Reference, 1-F-604.

SC-88: Malleable iron castings facilities suitable for producing castings for standard unions ½-inch to 3 inches in size. Galvanizing facilities also wanted. Patterns and core boxes to be supplied by prime contractor. Quantity, 500,000. Rating AA-1. Reference, 1-F-594.

New York office, Contract Distribution Branch of WPB, 122 East Forty-Second street, New York, reports the following subcontract opportunities:

S-12-: A Connecticut prime contractor seeks subcontracting facilities for an assembly job of turret tops. Material is 4140 steel on all of 625 assemblies with the exception of one, which is cast armor plate. Machine tools required, not necessarily in one shop, are four or five vertical boring mills capable of boring holes from 29½ to 34⅞ inches. Also medium sized milling machines and drill presses.

S-12-21031: A procurement agency is seeking subcontracting facilities specifically on a 180-ton 79¼ Toledo gap frame press.

S-12-15115: A Brooklyn manufacturer is seeking subcontracting facilities for manufacturer of gear blanks and other parts. Work consists of turning, boring and milling. Material is brass, bronze and steel. Machinery required, turret lathes, engine lathes with turret attachments, horizontal millers and Bridgeport vertical millers for fly cutting purposes. Tolerances are close.

S-13-21624: A Brooklyn prime contractor seeks subcontracting facilities on turret lathes up to 4⅝-inch diameter bar stock. Also jig borers, for production purposes. Tolerances, close. Material, steel, bronze and brass, furnished by prime.

S-13-21553: A Long Island City manufacturer seeks subcontracting facilities on four-spindle automatic screw machines, 2-inch capacity. Material, cold-rolled steel. Quantity, 1,000,000 of each.

Philadelphia Office, Contract Distribution Branch. Production Division, WPB, Broad Street Station building, reports the following subcontract opportunities:

Buescher-11-1: A Delaware concern requires 26 sets of cylindrical forging die inserts, five dies to a set. Requirements, six sets, one every ten days after receipt of order until May 1; 20 sets, one every six days for four months. Dimensions, 7-inch diameter x 17⅝-inch long. Die holes, 3.757 to 3.429-inch. Material will be furnished, 17⅝ x 7⅛-inch half-round Hardtem steel blocks. Brinell 3.40 to 3.55. Prints at Philadelphia office.

Buescher-10-1: A Pennsylvania manufacturer requires additional facilities for production of chain fittings. Various sizes from ⅝ to 2⅝ inches. Material will be furnished by prime contractor for at least part of requirements. Dies to be supplied by subcontractor. However, die blocks will be available for die sinker. Equipment, 1000 to 8000-pound drop forge hammers. Prints, specifications and samples at Philadelphia office.

Cruse-13-1: A government agency requires facilities for forging shafts, 37 inches long and 12 inches in diameter. Subcontractor should specify number of shafts he can handle and approximate earliest delivery. Necessary priority will be made available.

Minneapolis Office, Contract Distribution Branch of WPB, 334 Midland Bank building, is seeking contractors for the following:

S.O. No. 401: An Ohio contractor seeks facilities in Minneapolis area for production of several million screws, 51 different types and sizes, in quantities of 50,000 to 100,000 of each. Automatic screw machines are required. Material, stainless steel. Priority, AA-1. Tolerance, .002. Price to be negotiated. Drawings available.

S.O. No. 382: Nut. Quantity, 250,000, with deliveries of 50,000 per month. Material, furnished, is free-machining stainless steel. Requires machining, centerless grinding. Tolerance, .002. Drawings available.

S.O. No. 398: Screw nut. Quantity, 200,000, with delivery of 20,000 per week. Equipment, automatic screw machine, heat treating. Tolerance, .005. Material, cold-drawn steel, SAE 1112. Drawings and specifications available.

S.O. No. 399: Deflator. Quantity, 100,000 with deliveries of 10,000 per week. Equipment, automatic screw machines, heat treatment. Tolerance, .002. Material, cold-drawn steel, SAE 1112. Sand blast finish. Drawings and specifications available.

S.O. No. 400: Anchor chain. Chain is 1⅝-inch stock, wrought iron stud link. Forging and welding equipment is required. Quantities are large, two 120-fathom lengths wanted for each of 100 vessels. Deliveries for 10 vessels by May 1 and for 15 vessels monthly thereafter. Prime will consider bids on part of this total. U. S. Maritime specifications. Priority, AA-1.

Chicago office, Contract Distribution Branch of WPB, 226 West Jackson Boulevard, is seeking contractors for the following:

Automatic Electric Co., 1033 West Van Buren street, Chicago, attention E. C. Thompson. Priority, AA-1. Cord holder assembly which can be made by hand on a bench providing simple bending fixtures are set up. Subcontractor to do entire job, including furnishing material. Quantity, 950. Size 2 x 4½ inches. Material, cold-rolled steel. Equipment, 10-KVA butt welder and workbench.

Automatic Transportation Co., 101 West Eighty-seventh street, Chicago, attention J. J. Elliott. Priority, AA-1. Job comprises rolling, welding and shrinking of field rings for electric motors in five sizes, as follows: Rough inside diameter 5⅞ to 10⅝ inches; lengths of 5½ to 8¼ inches; metal thickness ⅝ to 1⅛ inches. Quantity, 500. Material, steel. Equipment needed for rolling, butt welding and shrinking.

Bell & Howell Co., 7100 McCormick boulevard, Lincolnwood, Ill., attention Clinton S. Davis. Priority, AA-1. Job consists of machine work on target gear, retainer and flange. Contractor will supply material, brass, aluminum and stainless steel. Quantity, 2000, 7800 and 2500, respectively. Equipment required, 2-inch capacity single-spindle automatic screw machine, 1-inch, 1½-inch and 2½-inch capacity turret lathes, No. 1 vertical milling machine, No. 1 plain horizontal milling machine.

Benjamin Electric Mfg. Co., Des Plaines, Ill., attention L. W. Kester. Priority, AA-1. Job covers forging of a cam, of tool steel. Contractor does entire job, including furnishing of material. Quantity, 5000. Size ¼ x 1 inch. Equipment, 400-pound drop hammer.

Electric Wheel Co., Quincy, Ill., attention W. H. Bryant. Priority, AA-1. Shackle bolts, in quantities of 500 to 5000 and in lengths of 3½, 4, 4½, 5, 5¾ and 6 inches. Material, SAE 1020 or X-1020 steel, suitable for case hardening. Subcontractor to do entire job, including furnishing material. Equipment, 1½-inch bar capacity turret lathe, plain No. 3 horizontal milling machine, 5/16-inch drilling capacity two-spindle bench drill, surface hardening equipment, No. 2 centerless external grinder.

STRUCTURAL SHAPES . .

SHAPE CONTRACTS PENDING

375 tons, Pennsylvania state bridge, Delaware county; F. A. Canuso & Son, Philadelphia, awarded general contract.

REINFORCING BARS . . .

REINFORCING BARS PLACED

400 tons, addition to airplane engine parts plant, Studebaker Corp., South Bend, Ind., to Joseph T. Ryerson & Son Inc., Chicago; Consolidated Construction Co., Chicago, contractor; bids March 26.

400 tons, addition to airplane engine parts plant, Studebaker Corp., Ft. Wayne, Ind., to Joseph T. Ryerson & Son Inc., Chicago; Consolidated Construction Co., Chicago, contractor; bids March 28.

REINFORCING BARS PENDING

900 tons, completion Spokane street viaduct, Seattle; (renegotiation) bids to state highway dpeartment, Olympia, April 20.

300 tons, addition to U. S. Veterans' hospital, St. Cloud, Minn.; bids postponed to April 20.

PIPE . . .

CAST PIPE PLACED

100 tons, 12 inch, Eighth Avenue South project, Seattle; to Hugh G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

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CONSTRUCTION AND ENTERPRISE

OHIO

AKRON, O.—Mohawk Rubber Co. will build additional warehouse 33 x 38 feet at 1235 Second street, at cost of $2500.

AKRON, O.—Akron Standard Mold Co., 1624 Englewood avenue, will take bids soon for a one-story brick factory addition 45 x 112 feet and plant alterations, to cost about $40,000. James F. Mumper, 647 Main street, is engineer. (Noted March 29).

CLEVELAND—Weatherhead Co., Albert J. Weatherhead Jr., president, 3000 East 131st street, will erect an incinerator costing $10,000.

CLEVELAND—Allyne Ryan Foundry Co., W. J. Sweeney, vice president and treasurer, 8916 Aetna avenue, is expanding furnace room facilities.

CLEVELAND—Ohio Crankshaft Co., Wm. Dunn, president, 3800 Harvard avenue, has let contract for 50 x 375-foot engineering and research laboratory to Sam W. Emerson Co., 1836 Euclid avenue. Estimated cost $250,000.

CLEVELAND—Acme Electric & Mfg. Co., D. J. Smith, manager, 1400 West Twenty-fifth street, has applied to zoning board of appeals to make alterations to machine shop at 1444 Hamilton avenue, which is leased by Rod Cutting Co., Frank Mawcino, president. 9305 Detroit avenue.

CLEVELAND—Standard Oil Co., C. H. Motz, superintendent, 2635 Broadway, will install two steel oil tanks 48 feet high and 100 feet in diameter, with capacities of 2,814,000 and 1,680,000 gallons, at cost of about $55,000. Chicago Bridge & Iron Co., Chicago, will fabricate tanks.

DAYTON, O.—Suburban Conservation district, care W. W. Morehouse, city water department, City Hall, Dayton, has preliminary plans completed for a sewage disposal plant. Rial T. Parrish, U. B. building, Dayton, is architect. Engineer is Alfred Lefeber, Temple Bar building, Cincinnati.

MANSFIELD, O.—Hartman Electric Mfg. Co., 37 East Fifth street, is erecting factory building.

MASSACHUSETTS

NEW BEDFORD, MASS.—Acushnet Process Co., Slocum street, has let contract for a two-story 45 x 120-foot plant addition on Belleville avenue, to Central Engineering & Construction Co., Bath street, Providence, R. I. Estimated cost $40,000.

CONNECTICUT

ANSONIA, CONN.—Ansonia Electric Co., 63 Main street, will let contract soon through Fletcher-Thompson Inc., 211 State street, Bridgeport, Conn., for a one-story 65 x 100-foot brick and steel utility building, to cost about $40,000.

BRIDGEPORT, CONN.—Bridgeport Brass Co., 20 Grand street, has plans nearing completion for a factory building. Fletcher-Thompson Inc., 211 State street, is engineer.

BRIDGEPORT, CONN.—Remington Arms Co. Inc., Barnum avenue, has let general contract for one-story and three smaller buildings to Harry Maring Jr. Inc., 336 Lindley street. Cost $65,000.

DANBURY, CONN.—H. Wibbing Tool & Mfg. Co., 116 Walker street, New York, is taking bids on a plant addition and alterations to existing plant on Taylor street, to cost about $40,000.

NEW YORK

NEW YORK—Heat & Power Co. Inc., 670 Sixth avenue, has bought the plant and machinery of the Vulcanite Portland Cement Co., Borough of Alpha, Warren county, New Jersey, with assessed value of $350,000.

NEW YORK—Standard Aircraft Products Inc., Dayton, O., has leased approximately 30,000 square feet of manufacturing space at 345 Hudson street for branch plant operations. The company manufactures airplane lining equipment, control instruments, etc.

NEW JERSEY

HARRISON, N. J.—Otis Elevator Co., 1000 First street, will build plant additions to cost about $750,000. Defense Plant Corp. will finance.

HOBOKEN, N. J.—Todd Drydocks Inc., River street, has let contract for extension of building to enlarge machine shop to Caye Construction Co. Inc., 356 Fulton street, Brooklyn, N. Y., to cost about $150,000, federally financed.

JERSEY CITY, N. J.—Standard Heater & Oil Equipment Co., 245 Corneilson avenue, is having plans prepared by M. Tepman, 28-60 Hudson boulevard, for a one-story assembly building and a two-story manufacturing building, to cost about $40,000. A. Frank, 28-40 Hudson boulevard, is engineer.

PATERSON, N. J.—Wright Aeronautical Corp., 132 Beckwith street, is having plans prepared by Albert Kahn Associates, engineers, 345 New Center building, Detroit, for a one-story brick and steel boiler and powerhouse, to cost about $50,000. Federally financed.

PENNSYLVANIA

ERIE, PA.—Clifton Automatic Screw Machine Co., 217 West Twelfth street, is erecting machine shop addition.

CALLERY, PA.—Mine Safety Appliance Co., 201 North Braddock avenue, is taking bids on general contract for a sewage disposal plant, estimated to cost about $30,000. Prack & Prack, 317 Martin building, NS Pittsburgh, are architects.

ILLINOIS

CHICAGO—Solar Mfg. Corp., 4501 South Western avenue, has let contract for four-story 149 x 458-foot factory to Krahl Construction Co., 350 North Clark street. Estimated cost is $42,000. Carl I. Goldberg, 898 Bergen avenue, Jersey City, N. J., is architect.

EAST ST. LOUIS, ILL.—Construction will start at once on foundry building for Key Co., 2700 McCasland avenue. General contract has been awarded to Fruin-Colnon Construction Co., 520 Merchants-Laclede building, St. Louis. (Noted March 29).

ROCKFORD, ILL.—Sundstrand Machine Tool Co. plans addition to plant to cost $200,000. Defense Plant Corp. will finance.

MARYLAND

BALTIMORE—Balmar Corp., C. D. Heubeck, in charge, Clipper road, Woodberry, Md., will build one-story machine shop costing $50,000.

ALABAMA

SHEFFIELD, ALA.—Reynolds Alloys Corp. has awarded contract for plant to Andrew Weston Co., 7 East Forty-second street, New York. Estimated cost $3,500,000.

TENNESSEE

KINGSPORT, TENN.—City receives bids April 15 for addition to filter plant, estimated to cost $225,000. Wiedeman & Singleton, engineers, Citizens & Southern building, Atlanta, Ga.

LOUISIANA

BATON ROUGE, LA.—Defense Plant Corp. has increased its contract with Standard Oil Co. of Louisiana, Baton Rouge, by $500,000, to provide additional facilities.

FLORIDA

JACKSONVILLE, FLA.—S. J. Stubbs Lumber Co., P.O. Box 2008, is rebuilding burned sawmill. Cost of plant $25,000; equipment, $15,000.

MIAMI, FLA.—Defense Plant Corp. has authorized increase in its contract with Tycoon Tackle Inc., Miami, to provide additional equipment and machinery at plant in Florida.

WEST VIRGINIA

BERKELEY COUNTY, W. VA.—Explosive Products Corp., Fifteenth and G streets,

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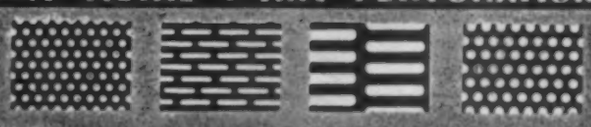

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Washington, is taking bids for manufacturing plant at Light Farm on Williamsport Pike, here. Approximate cost $150,000

VIRGINIA

SOUTH BOSTON, VA.—South Boston Lumber & Builder's Corp., South Boston, is rebuilding planing mill.

MISSOURI

ST. LOUIS—Defense Plant Corp. has increased its contract with McDonnell Aircraft Corp. by $150,000, to provide additional equipment.

ST. LOUIS—Defense Plant Corp. has increased its contract with Southern Acid & Sulphur Co., Rialto building, by $700,000, to provide additional facilities in Texas.

ST. LOUIS—Iside Alberici, 1546 Irving street, has given contract to J. S. Alberici Construction Co., Boatmen's Bank building, for two-story parts and service building.

ST. LOUIS—H. & H. Machine & Motor Parts Co., 4216 West Easton avenue, has let contract to Saum Architects, 713½ Chestnut street, for design and erection of one-story machine shop.

ST. LOUIS—American Smelting & Refining Co., 4041 Park avenue, has awarded contract to J. S. Alberici Construction Co., 1824 Boatmen's Bank building, for one-story factory building.

ST. LOUIS—General Cable Corp., 420 Lexington avenue, New York, plans construction and completion of additional facilities at its Missouri plant. Cost $40,000 with equipment. Defense Plant Corp. will finance.

ST. LOUIS—Hammer Dry Plate & Film Co., 3533 Ohio avenue, has awarded contract to A. H. Haeseler Building & Contracting Co., 2346 Palm street, for rebuilding portions of plant destroyed or damaged by fire. (Noted March 15).

SPRINGFIELD, MO.—Acme Foundry & Machine Co. has been incorporated with $20,000 capital to operate a foundry and machine shop, by S. H. Vienhage, Rose Vienhage and S. H. Vienhage Jr., all of Springfield. Farrington & Curtis are attorneys for the company.

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ARKANSAS

EL DORADO, ARK.—Defense Plant Corp. has authorized an increase in its contract with Lion Oil Refining Co., El Dorado, for additional plant facilities costing $325,000. Plant is under construction.

WISCONSIN

APPLETON, WIS.—Kurz & Root Co. plans addition to factory. Plans are being prepared by Robert M. Connelly, engineer.

BROOKFIELD, WIS.—Greenfield Heights Sanitary District, R. D. 5, Waukesha, Wis., is preparing a report and estimate for a sewage disposal plant and sanitary sewers. Herbert Moore, 904 South Layton boulevard, Milwaukee, is engineer.

EAU CLAIRE, WIS.—Drummond Packing Co. plans addition to meat packing plant. Smith, Brubaker & Egan, 30 North LaSalle street, Chicago, architects and engineers.

FOND DU LAC, WIS.—Wells Mfg. Corp. plans to rebuild three-story factory recently destroyed by fire. Ben Sadoff is president.

GREEN BAY, WIS.—Hudson-Sharp Machine Co. plans one-story factory addition.

KENOSHA, WIS.—Dynamatic Corp. has given contract to Anton J. Larsen for one-story plant addition.

MANITOWOC, WIS.—Heresite & Chemical Co. plans one-story factory addition. F. W. Raeuber is architect.

MILWAUKEE—Nordberg Mfg. Co. has given contract to Meredith Bros. Inc., 121 East Washington, for one-story factory.

WAUKESHA, WIS.—Michael Yundt Mfg. Co., 225 North Grand avenue, has let contract for a one-story 50 x 195-foot manufacturing plant addition to Stiegerwald & Sons Inc., 5310 West State street, Milwaukee. F. F. Drolshagen, 647 West Virginia street, Milwaukee, is engineer.

WEST ALLIS, WIS.—Allis-Chalmers Mfg. Co., 1126 South Seventieth street, will build a two-story 32 x 70-foot painting and annealing building addition and two-story 20 x 50-foot plate and tank shop addition. Contract to Meredith Bros. Inc., 121 East Washington street. Also one-story 20 x 48-foot addition to shops 6 and 7, to Madson-Christenson Co., 3613 West National avenue, Milwaukee. C. Meyer, care owner, is architect.

MINNESOTA

MINNEAPOLIS—Gray Co. Inc. has begun construction of an addition and is making alterations to present plant. B. A. Beaver is engineer in charge of construction.

MINNEAPOLIS—Union Tool & Engineering Co., 501 Transportation building, has been incorporated with capital stock of $25,000 by Chris S. Gianos, James A. Karusis and S. W. Maroosis.

ST. PAUL—Progress Pattern Co., 1457 Marshall avenue, Joseph Garske, proprietor, plans large addition to plant to be used for core-making and casting of magnesium.

SOUTH ST. PAUL, MINN.—Swift & Co. plans erection of cooler building at meat packing plant.

TEXAS

DALLAS, TEX.—United States engineers, Denison, Tex., have let contract to Oil Well Supply Co., 2001 North Lamar, Dallas, for a steam plant to be erected in Smith county, to cost $499,000.

IOWA

CEDAR RAPIDS, IOWA—Wilson & Co. Inc. will soon award contracts for six-story cooler building at meat packing plant. Walter H. Wheeler, Metropolitan Life building, Minneapolis, structural engineer.

WATERLOO, IOWA—Associated Ordnance Co. of Waterloo Inc. has been incorporated with capital stock of $50,000 to manufacture machinery, implements and ordnance material, by Miles Potter, president; H. B. Plumb, vice president, and B. F. Wipplinger, secretary.

MONTANA

BUTTE, MONT.—War Production Board has approved construction of a mill to treat manganese ores produced by mines in the Butte-Phillipsburg area. The mill, to be owned by Defense Plant Corp., will have capacity of 400 tons a day.

IDAHO

BOISE, IDAHO—Idaho Power Co. will build a 110-mile, high voltage power line from the Snake river to mining areas in west central Idaho.

WASHINGTON

SEATTLE—North Pacific Shipbuilding Co. has been incorporated by F. H. Hawthorne and Associates, 1310 Hoge building.

SEATTLE—Washington Iron Works, 1500 Sixth avenue South, has awarded contract to C. L. Fey to build an addition to machine shop.

SEATTLE—Chain Gear Inc. has been organized by J. J. Koenig and Associates, 1319 Northern Life Tower, to manufacture and deal in iron and steel products.

CANADA

GUELPH, ONT.—Northern Rubber Co. Ltd., Metcalfe street, has let contracts and will start work soon on construction of plant addition here to cost $53,000 with equipment.

PORT ARTHUR, ONT.—Canadian National Railways, J. W. Porter, chief engineer, western region, will engage consulting engineers, and have plans prepared for construction of an ore dock here to be used by Steep Rock Iron Mines Ltd. A spur line also will be built into the property from the railroad, at estimated total cost of approximately $2,000,000. Plans call for completion of the undertaking in time to handle ore from the mine next year.

SAULT STE. MARIE, ONT.—Chromium Mining & Smelting Corp. Ltd., 395 Queen street West, will start work immediately on repairs and addition to plant to cost about $20,000.

MONTREAL, QUE.—Department of Munitions and Supply, Ottawa, R. T. Donald, secretary, has given general contract to J. S. Hewson, 660 St. Catharine street West, for alterations and addition to aircraft plant in this area to cost $75,000.

MOUNT ROYAL, QUE.—Canadian Marconi Co., 2440 Trenton avenue, is calling revised bids for plant additions estimated to cost about $80,000 with equipment. James C. Meadowcroft, 1154 Beaver Hall Square, is architect.

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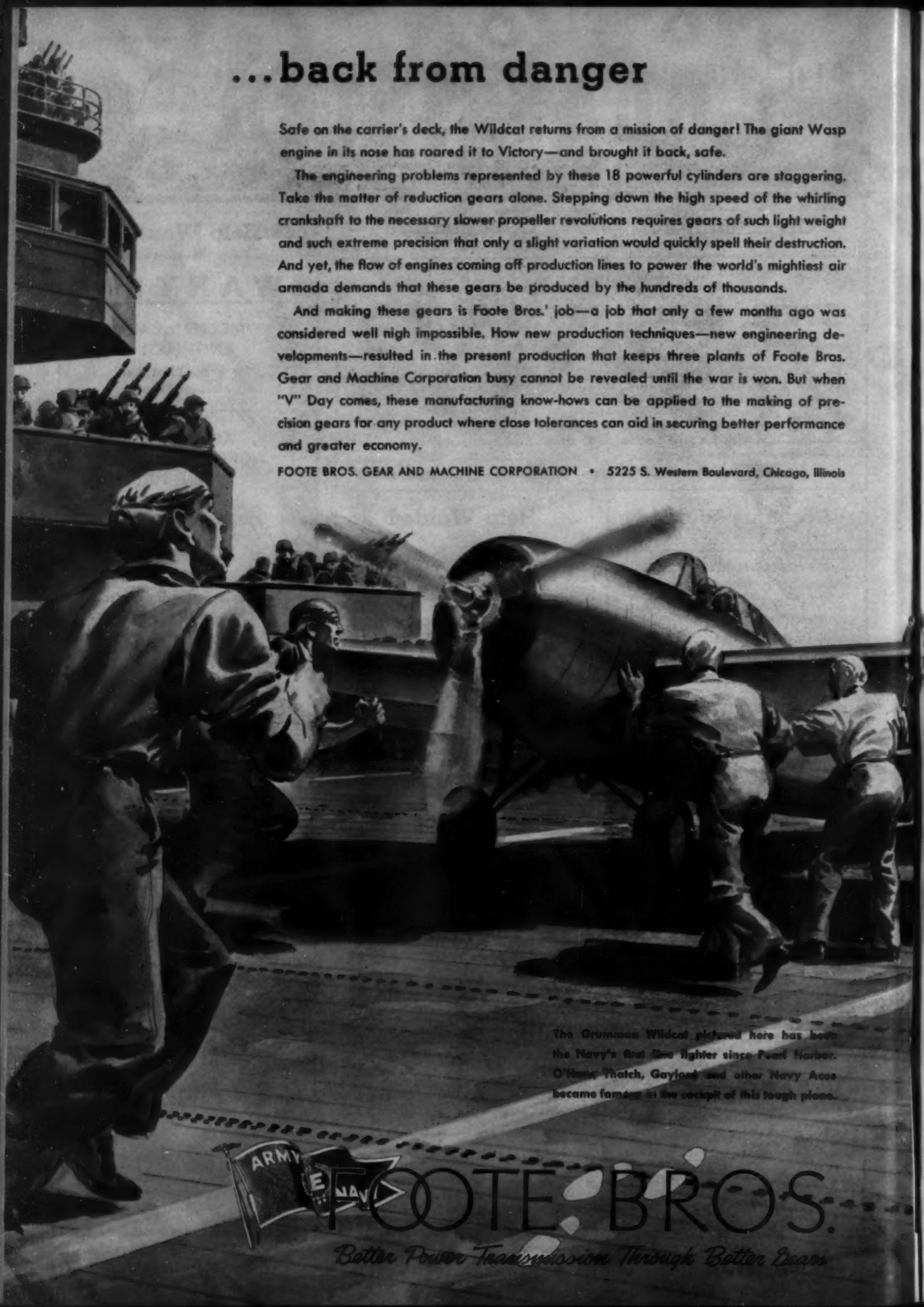

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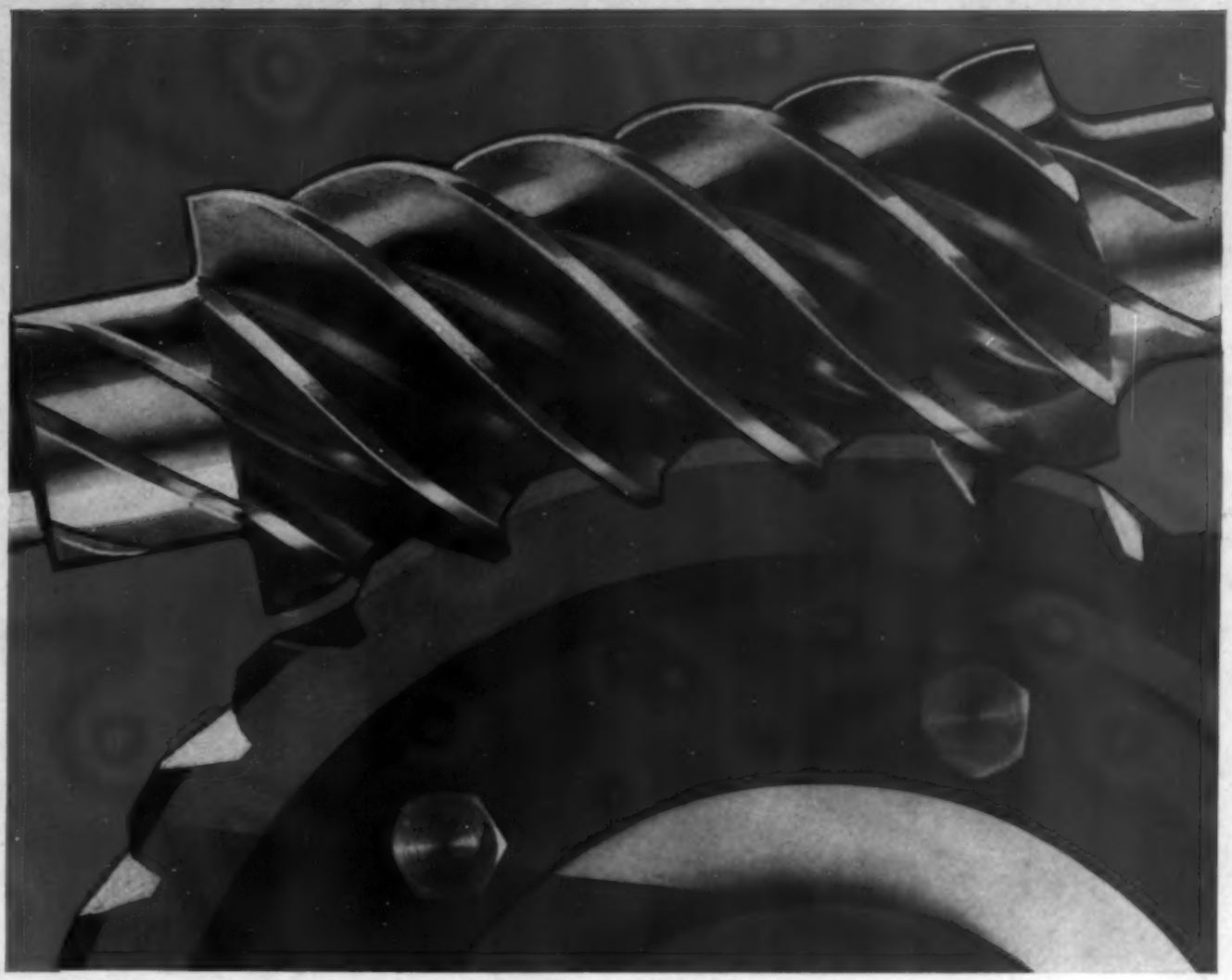

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